

US008990721B2

(12) **United States Patent**
Choi

(10) **Patent No.:** **US 8,990,721 B2**
(45) **Date of Patent:** **Mar. 24, 2015**

(54) **MOBILE TERMINAL AND METHOD OF CONTROLLING THE SAME**

2010/0071038 A1* 3/2010 Flynn et al. 726/5
2010/0169790 A1* 7/2010 Vaughan et al. 715/740
2012/0165071 A1* 6/2012 Hsu et al. 455/557

(75) Inventor: **Haengkeol Choi**, Seoul (KR)

FOREIGN PATENT DOCUMENTS

(73) Assignee: **LG Electronics Inc.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 595 days.

CN 1363184 8/2002
CN 101662667 3/2010
EP 0475581 3/1992
WO 01/18691 3/2001

OTHER PUBLICATIONS

(21) Appl. No.: **13/089,190**

(22) Filed: **Apr. 18, 2011**

(65) **Prior Publication Data**

US 2011/0276911 A1 Nov. 10, 2011

(30) **Foreign Application Priority Data**

May 6, 2010 (KR) 10-2010-0042565

(51) **Int. Cl.**
G06F 3/00 (2006.01)
G06F 3/048 (2013.01)
G06F 9/44 (2006.01)

(52) **U.S. Cl.**
CPC **G06F 9/4445** (2013.01)
USPC **715/769; 715/782; 715/753**

(58) **Field of Classification Search**
USPC 715/769, 723, 753, 758, 782, 736-742
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,867,654 A 2/1999 Ludwig et al.
7,620,906 B2* 11/2009 Igeta 715/769
2009/0222766 A1* 9/2009 Chae et al. 715/835

LanSchool 7.4, Users Guide, Copyright 1996-2009, pp. 1-29.*
The State Intellectual Property Office of the People's Republic of China Application Serial No. 201110119277.2, Office Action dated Feb. 18, 2013, 8 pages.

* cited by examiner

Primary Examiner — Weilun Lo

Assistant Examiner — Truc Chuong

(74) *Attorney, Agent, or Firm* — Lee, Hong, Degerman, Kang & Waimey

(57) **ABSTRACT**

A mobile terminal includes a display, a communication unit receiving, from other electronic devices, information related to contents being executed at the other electronic devices, and a controller controlling displaying of widgets individually corresponding to a respective one of the electronic devices on the display. Each of the widgets displayed on the display of the mobile terminal represents information relating to contents that is being executed at a corresponding one of the other electronic devices.

18 Claims, 24 Drawing Sheets

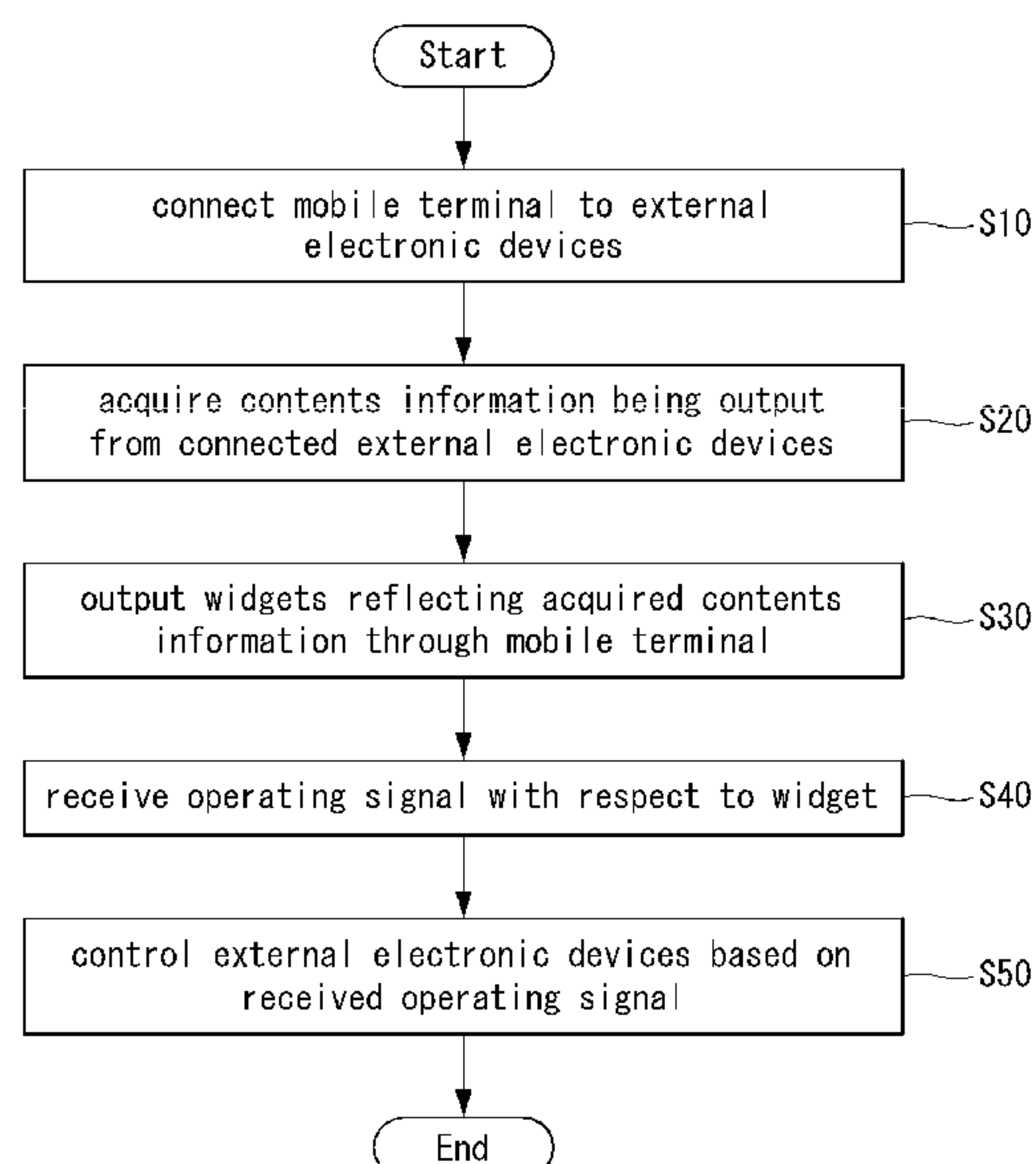


FIG. 1

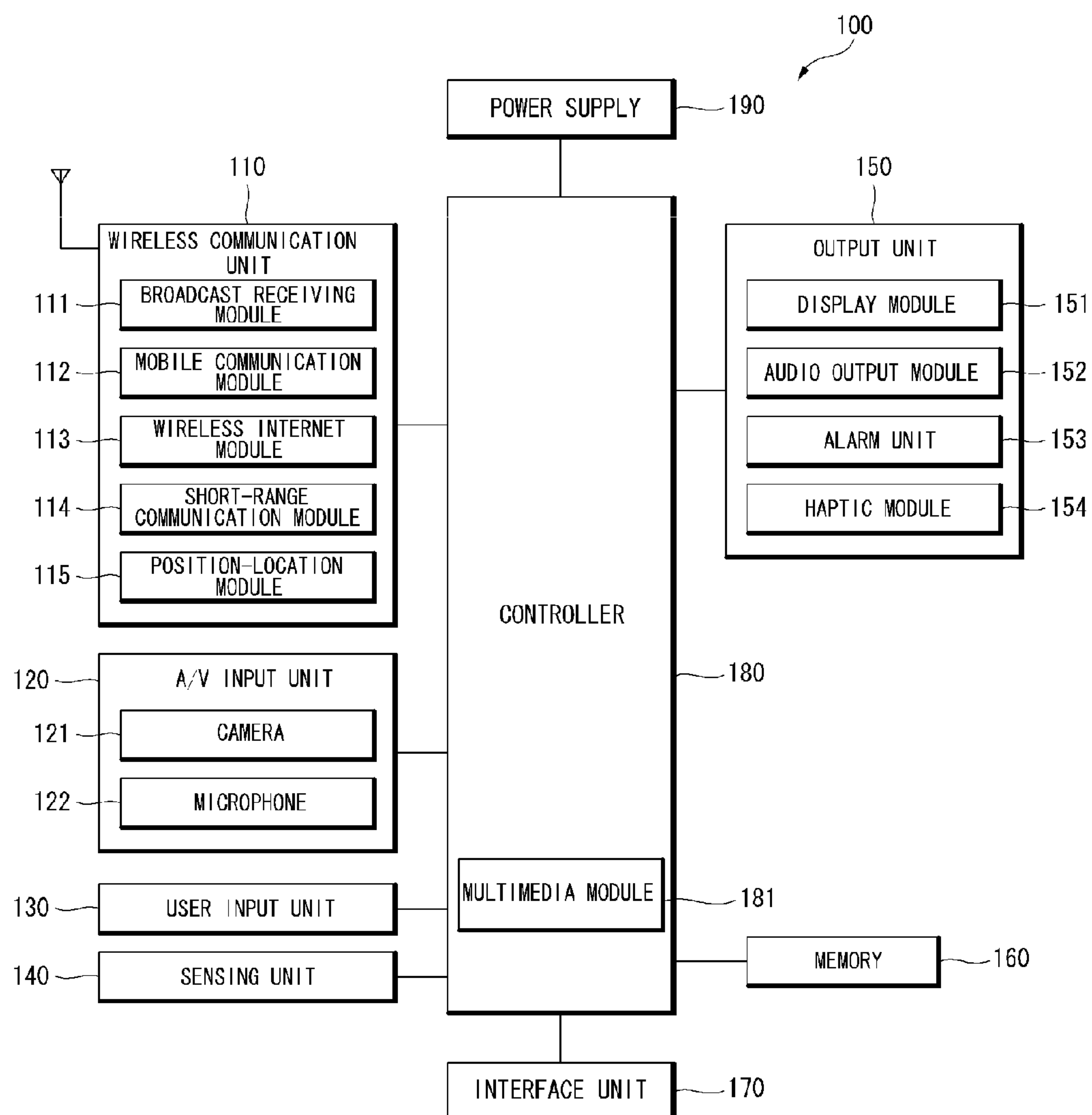


FIG. 2A

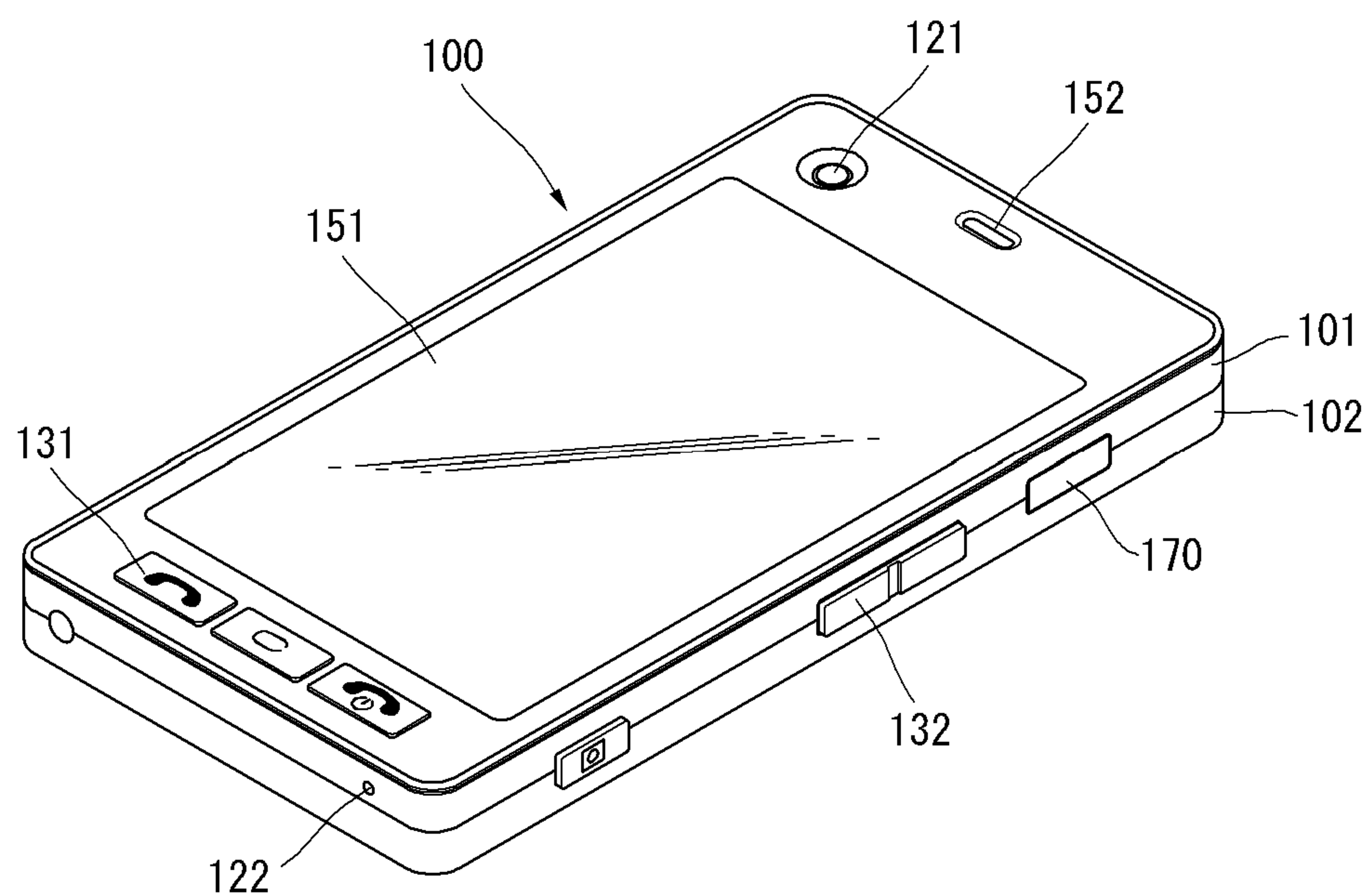


FIG. 2B

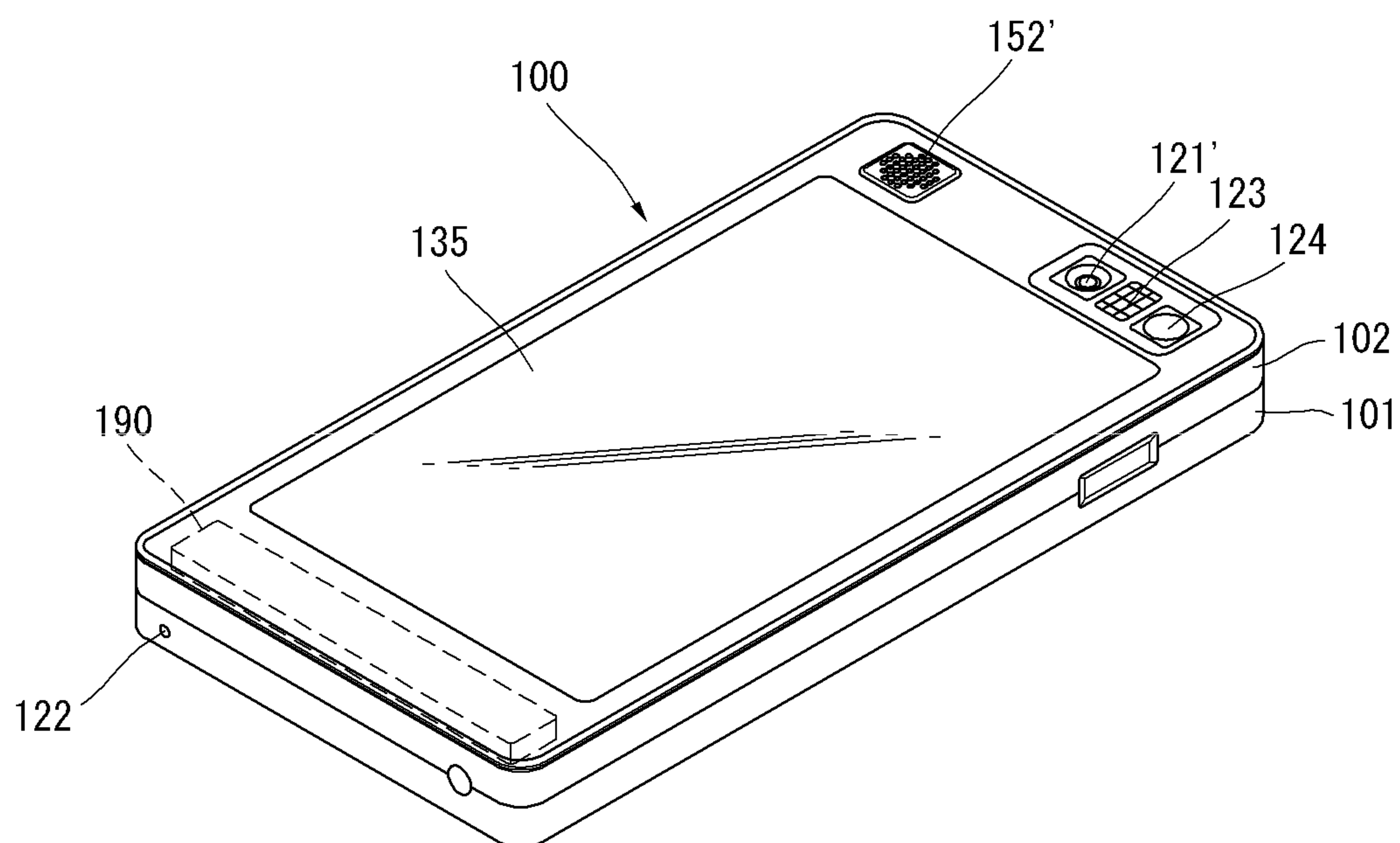


FIG. 2C

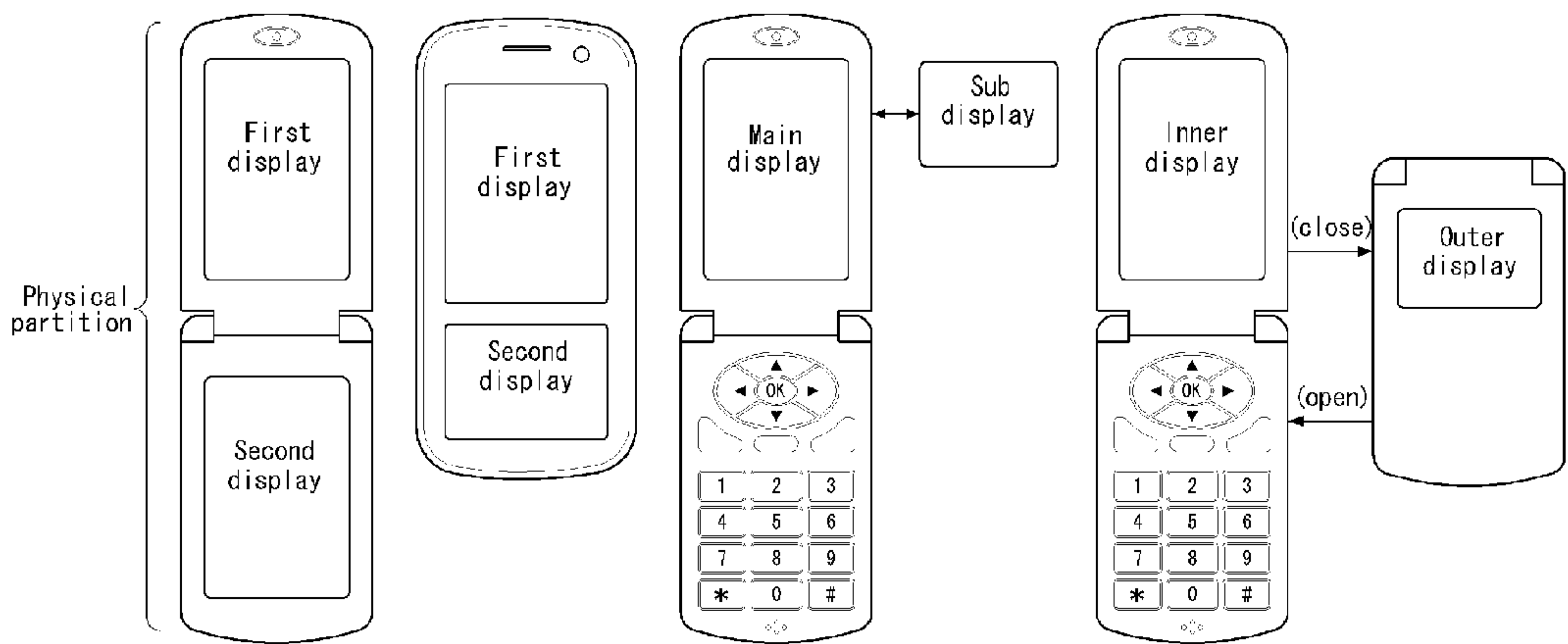


FIG. 2D

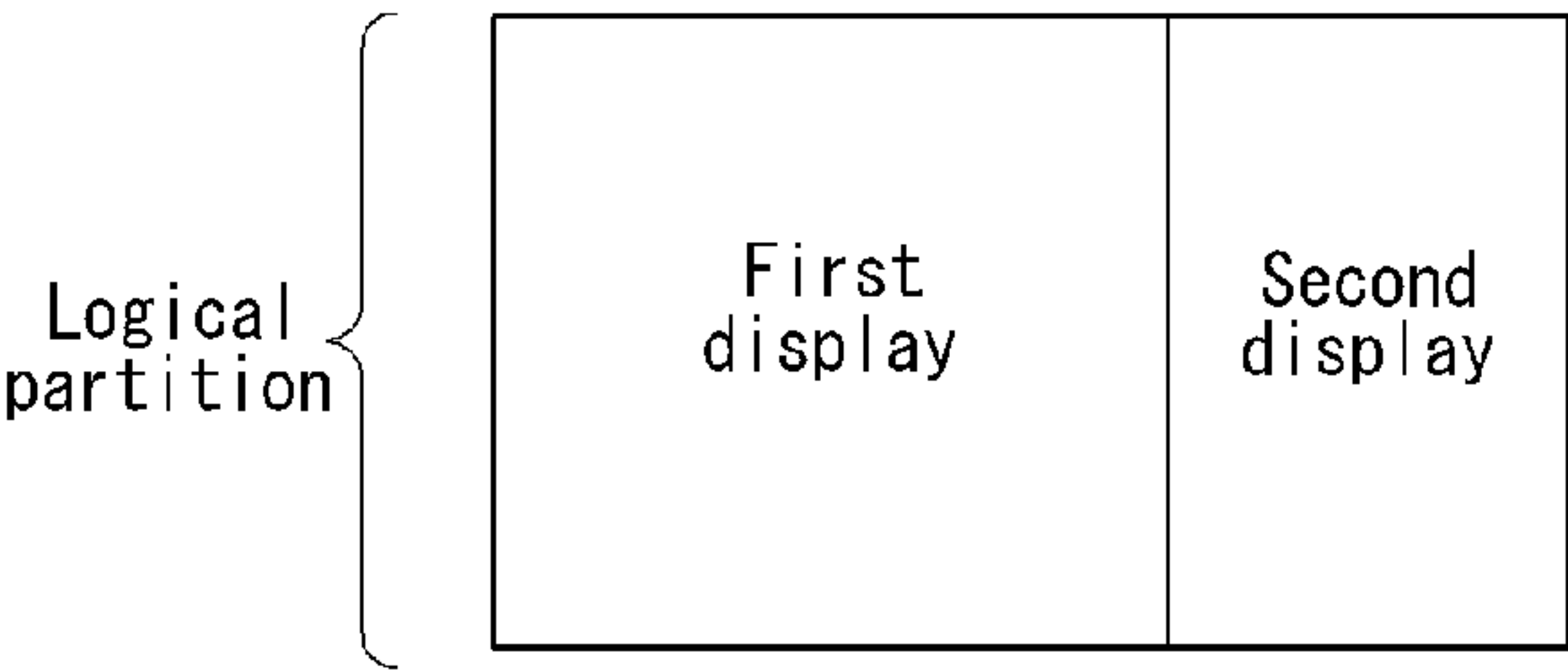


FIG. 3

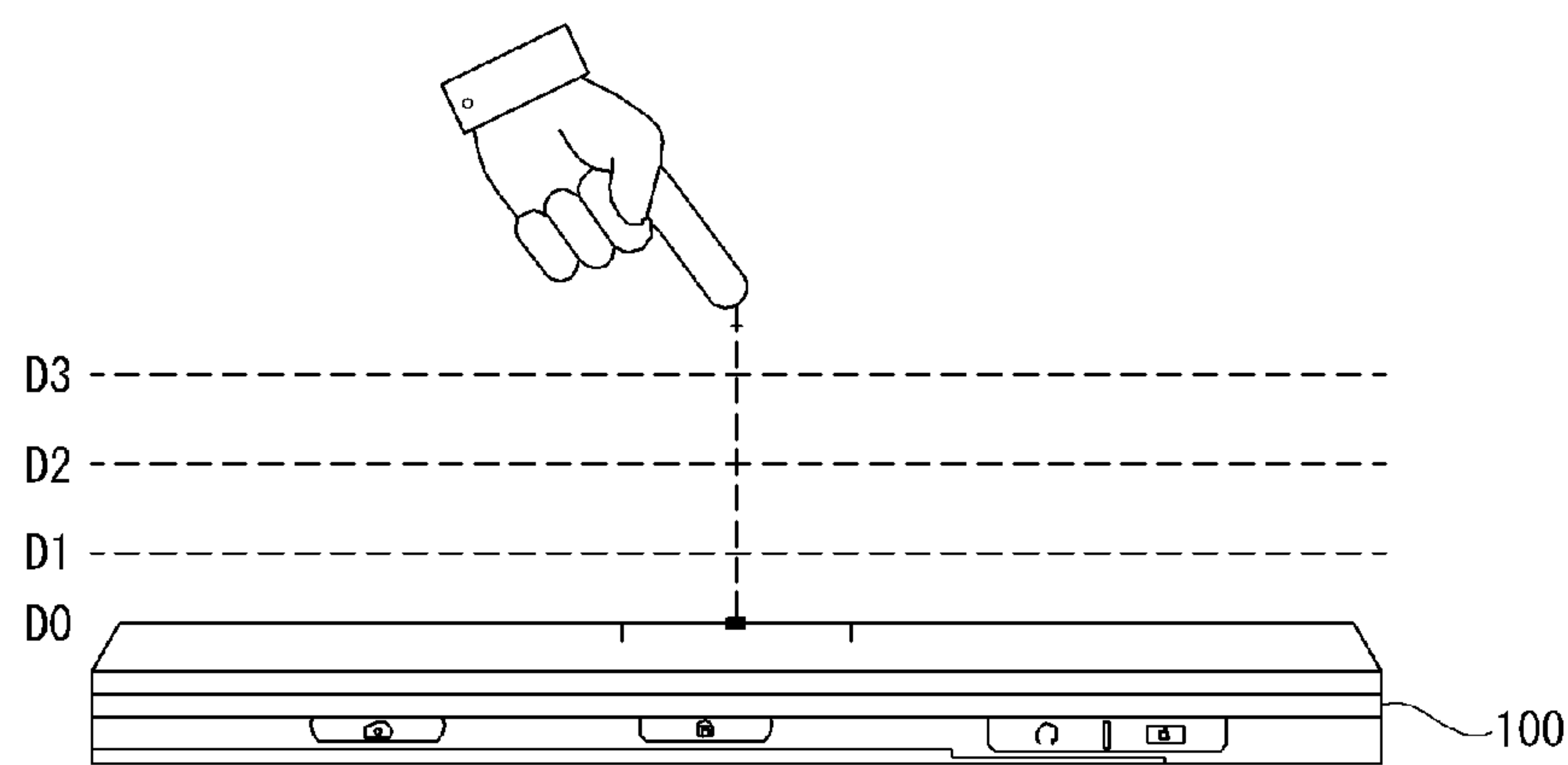


FIG. 4

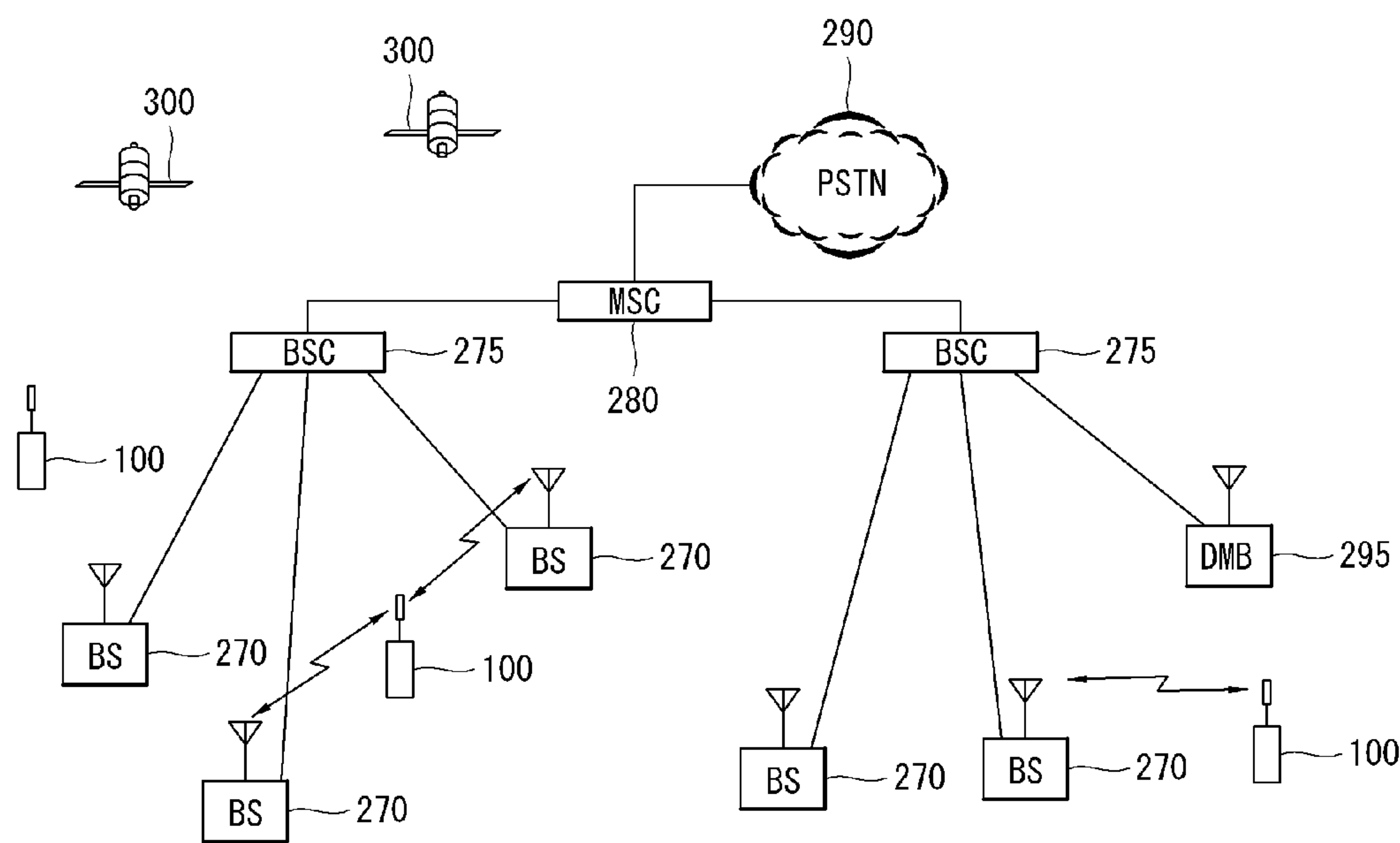


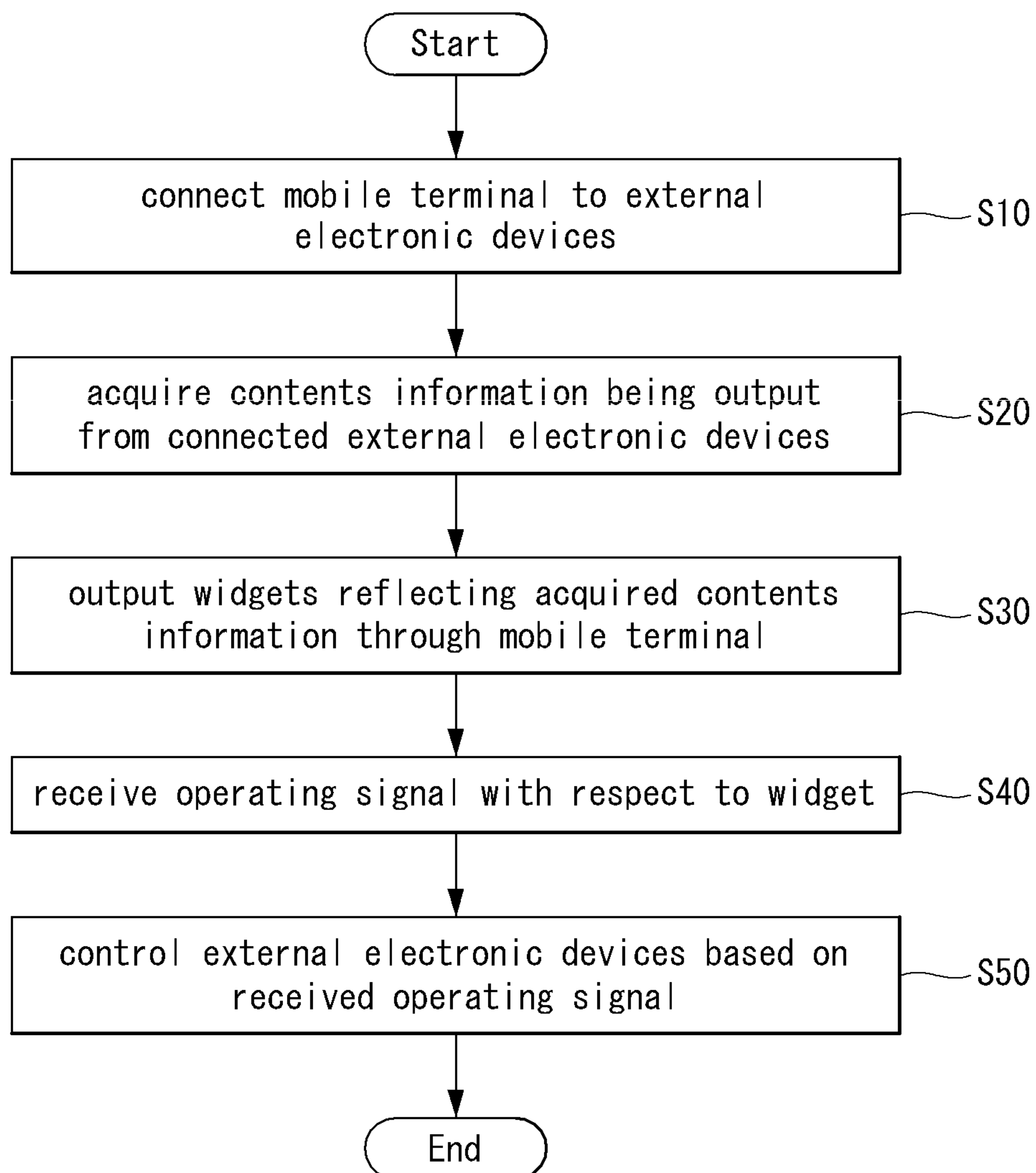
FIG. 5

FIG. 6

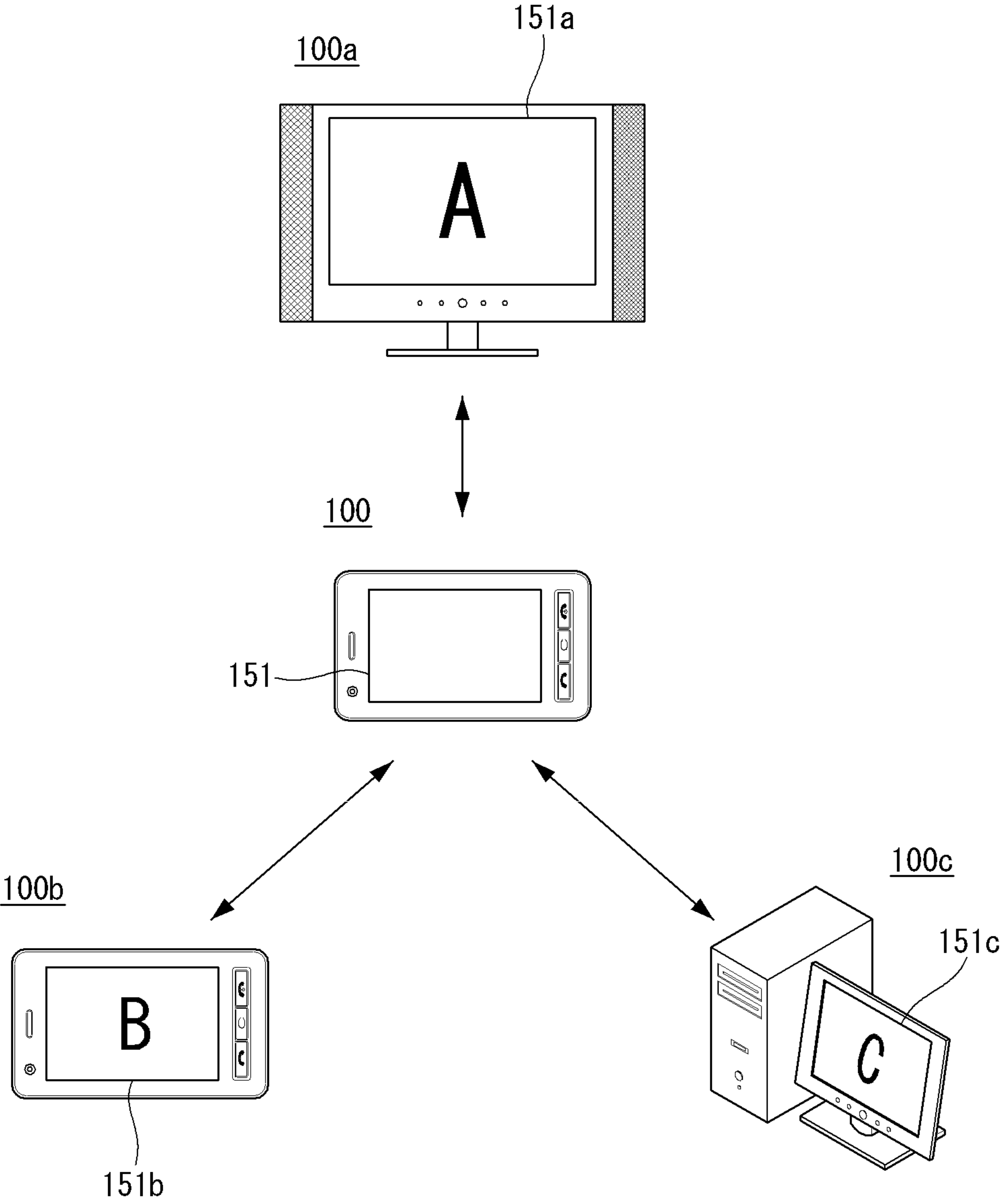


FIG. 7

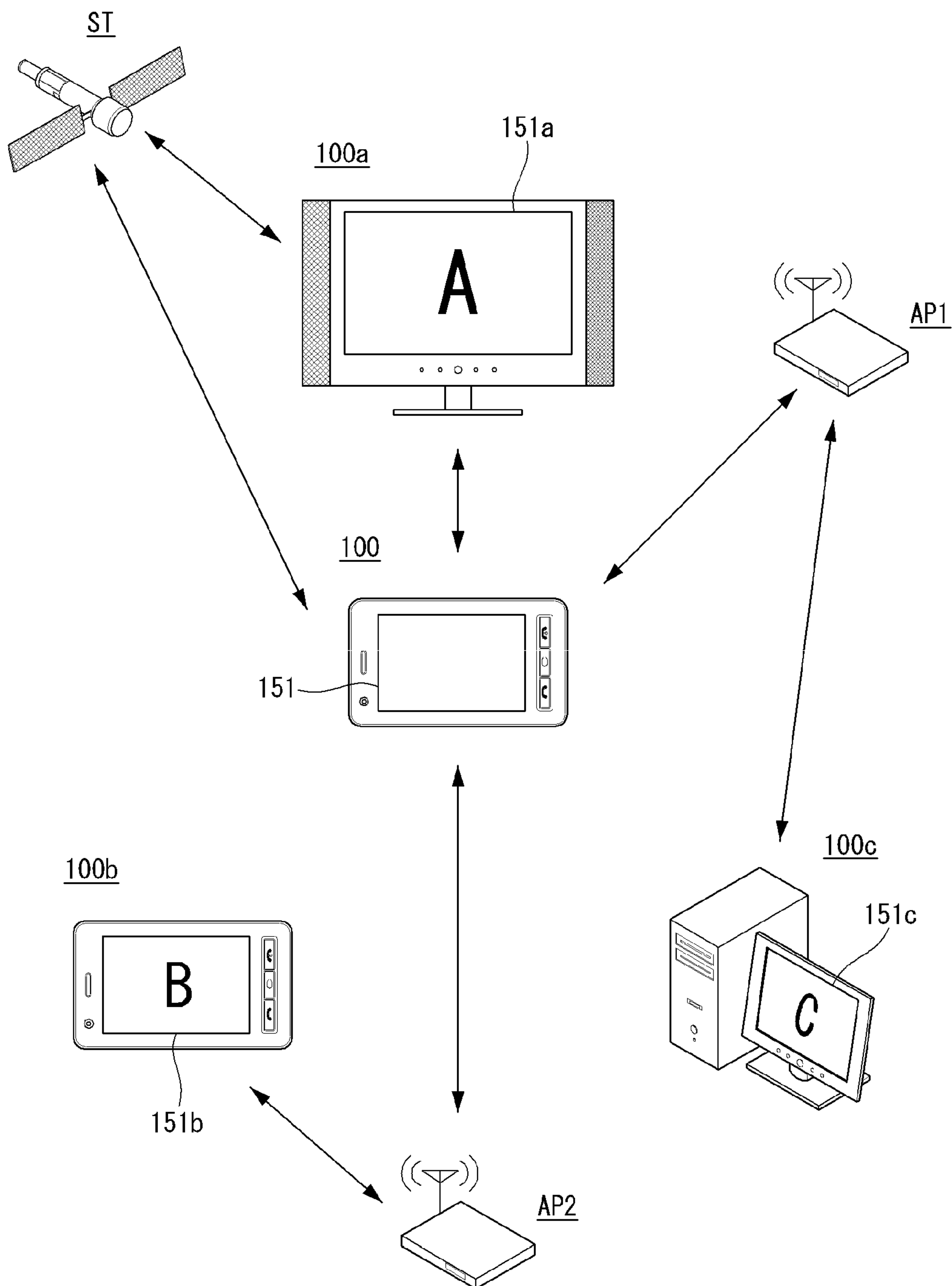


FIG. 8

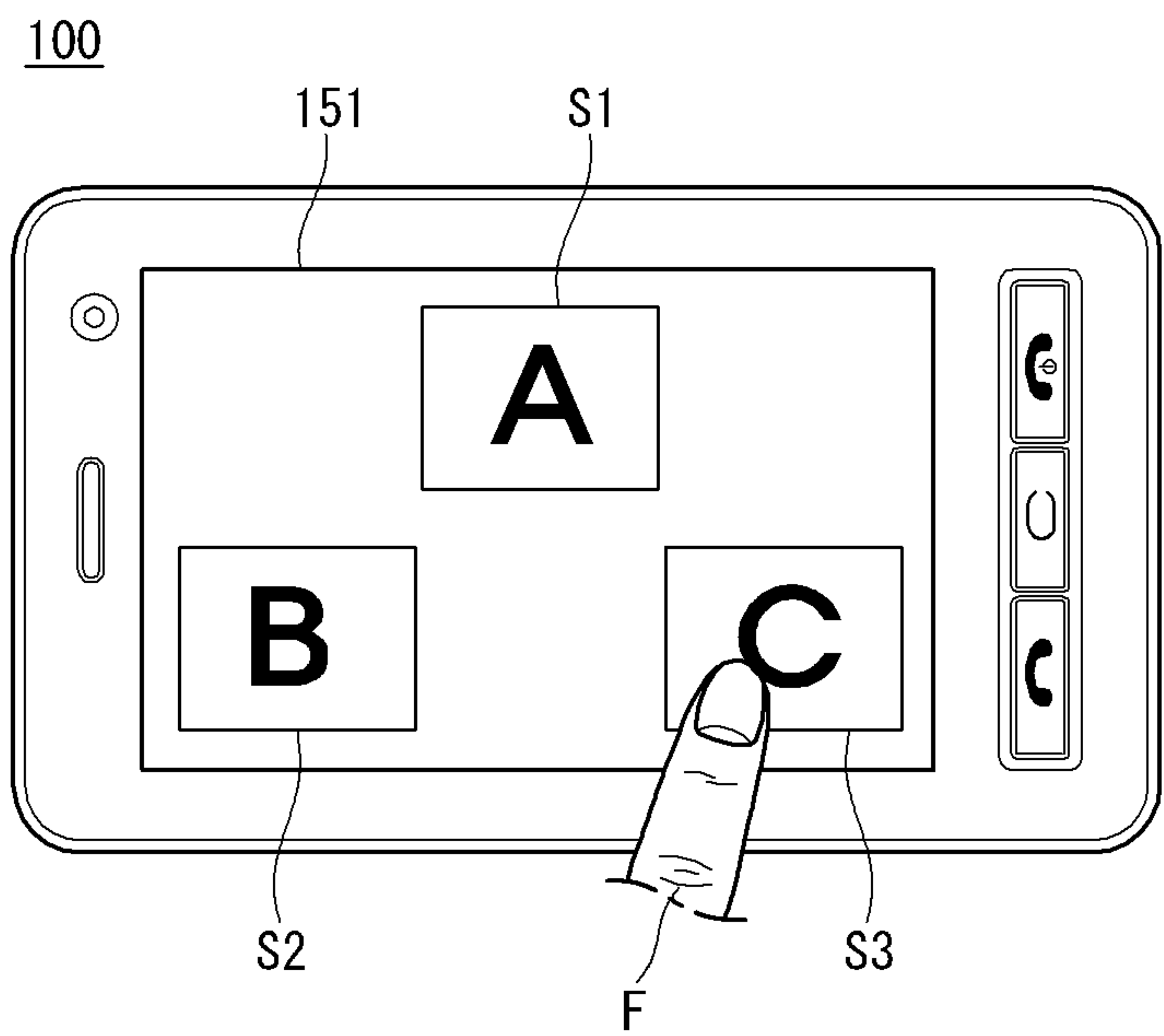


FIG. 9

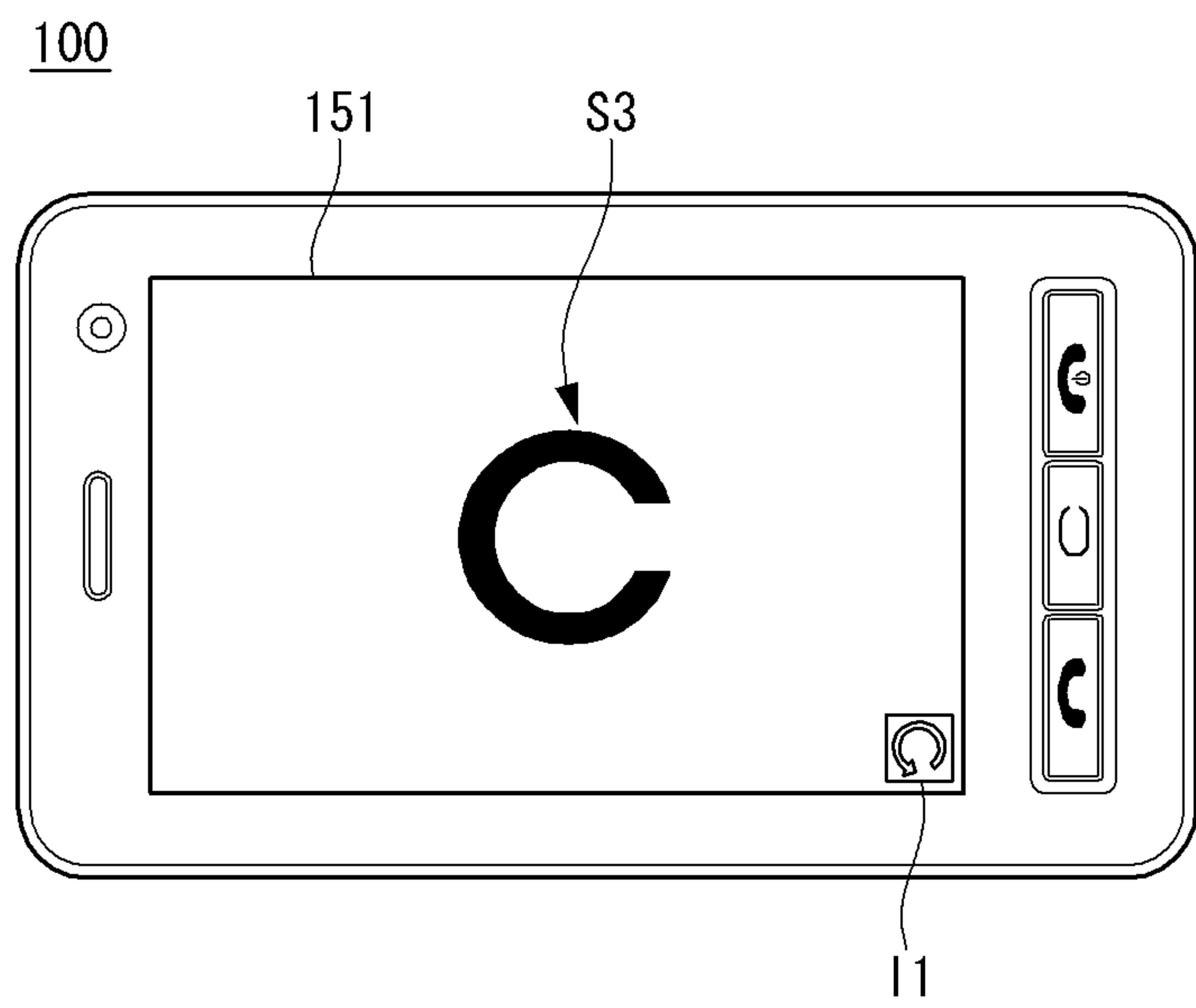


FIG. 10

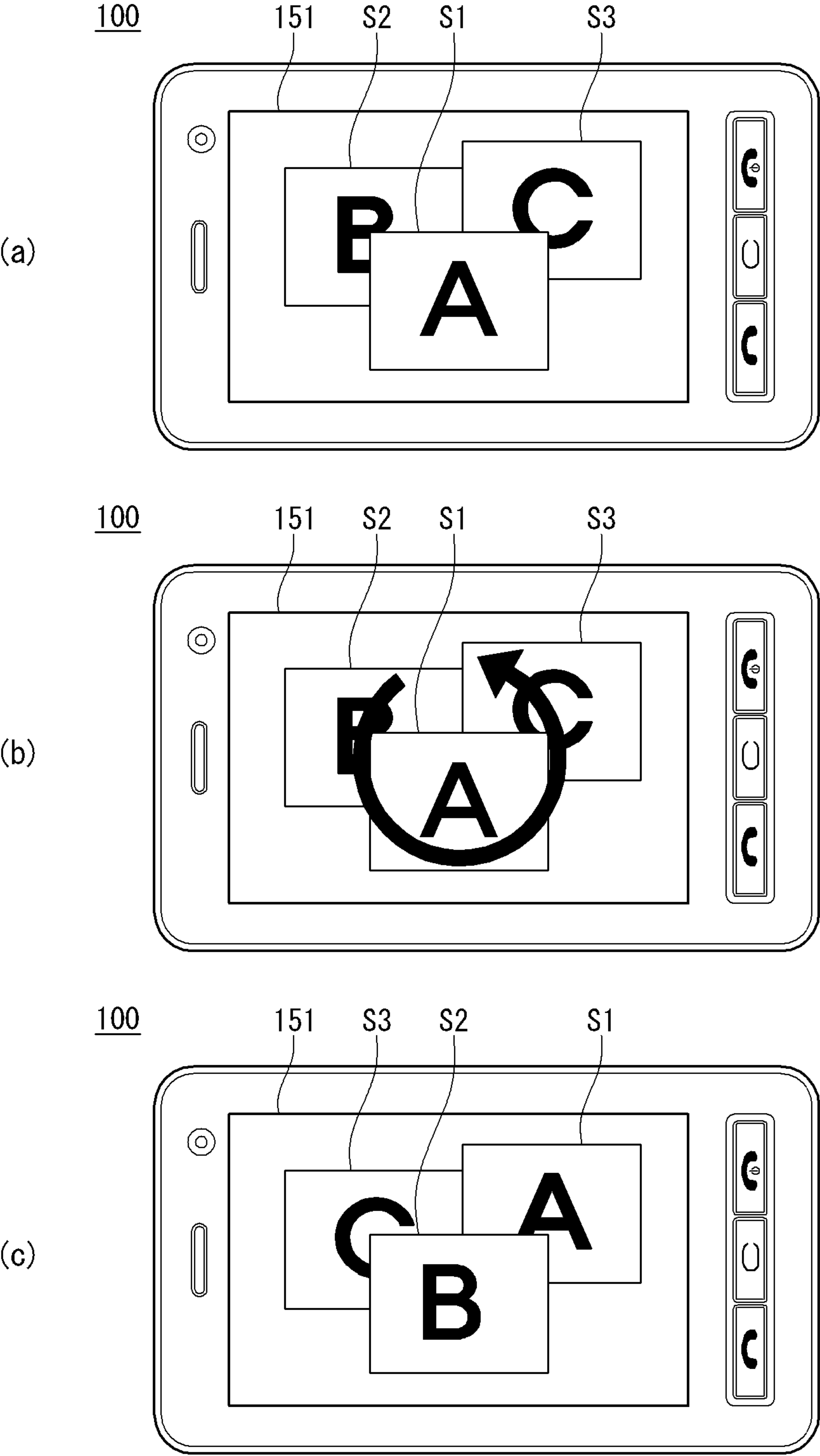


FIG. 11

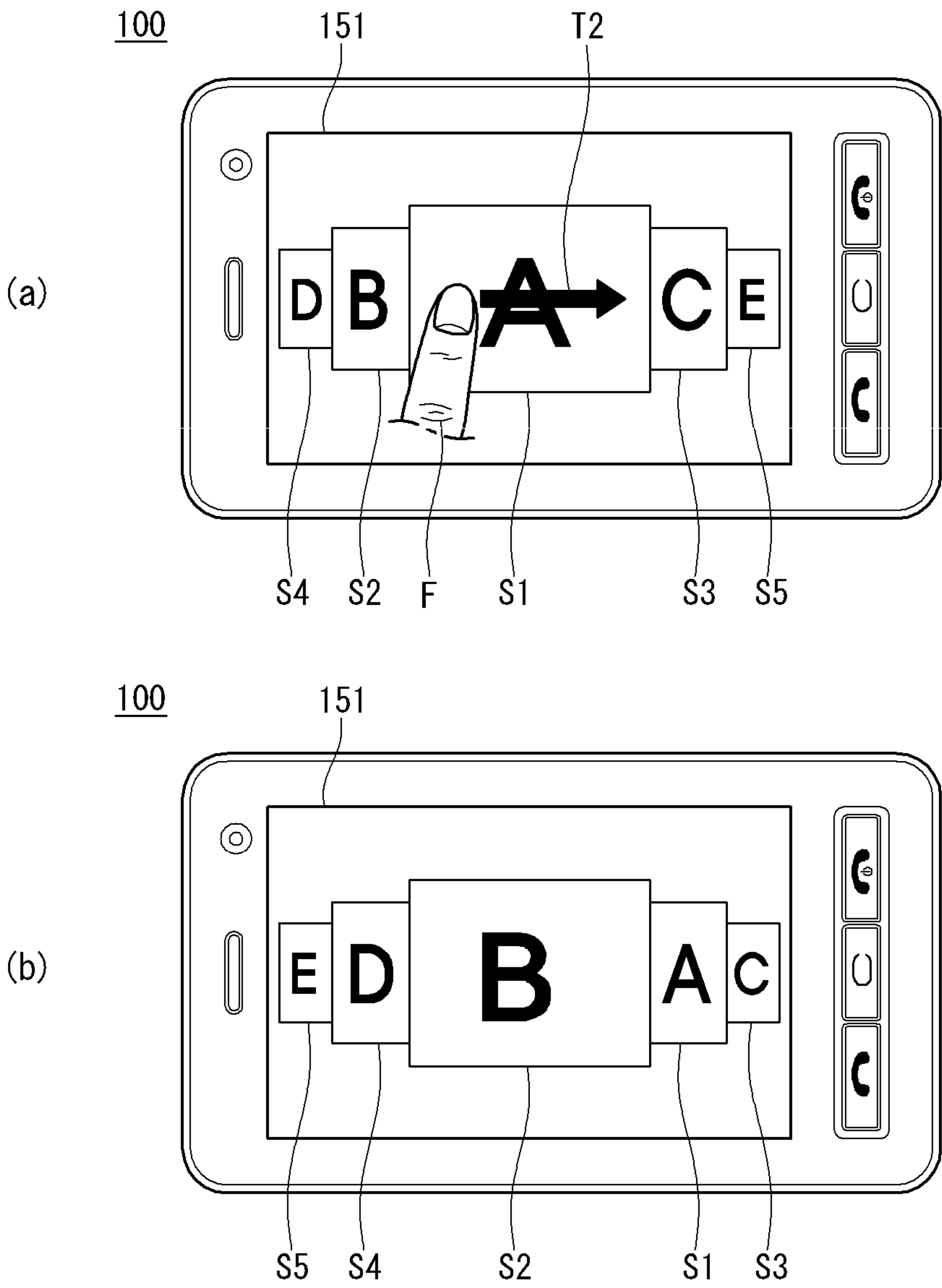


FIG. 12

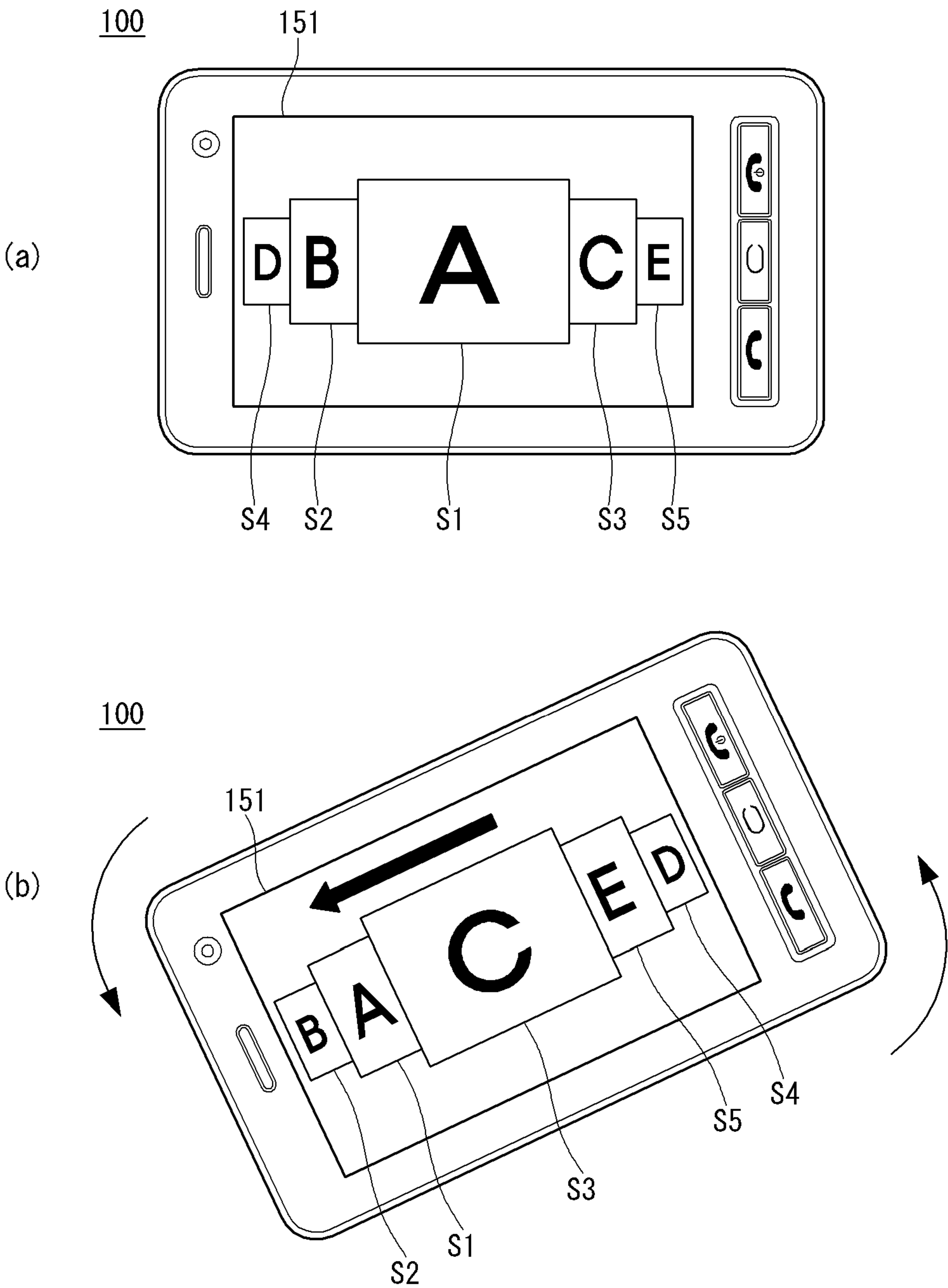


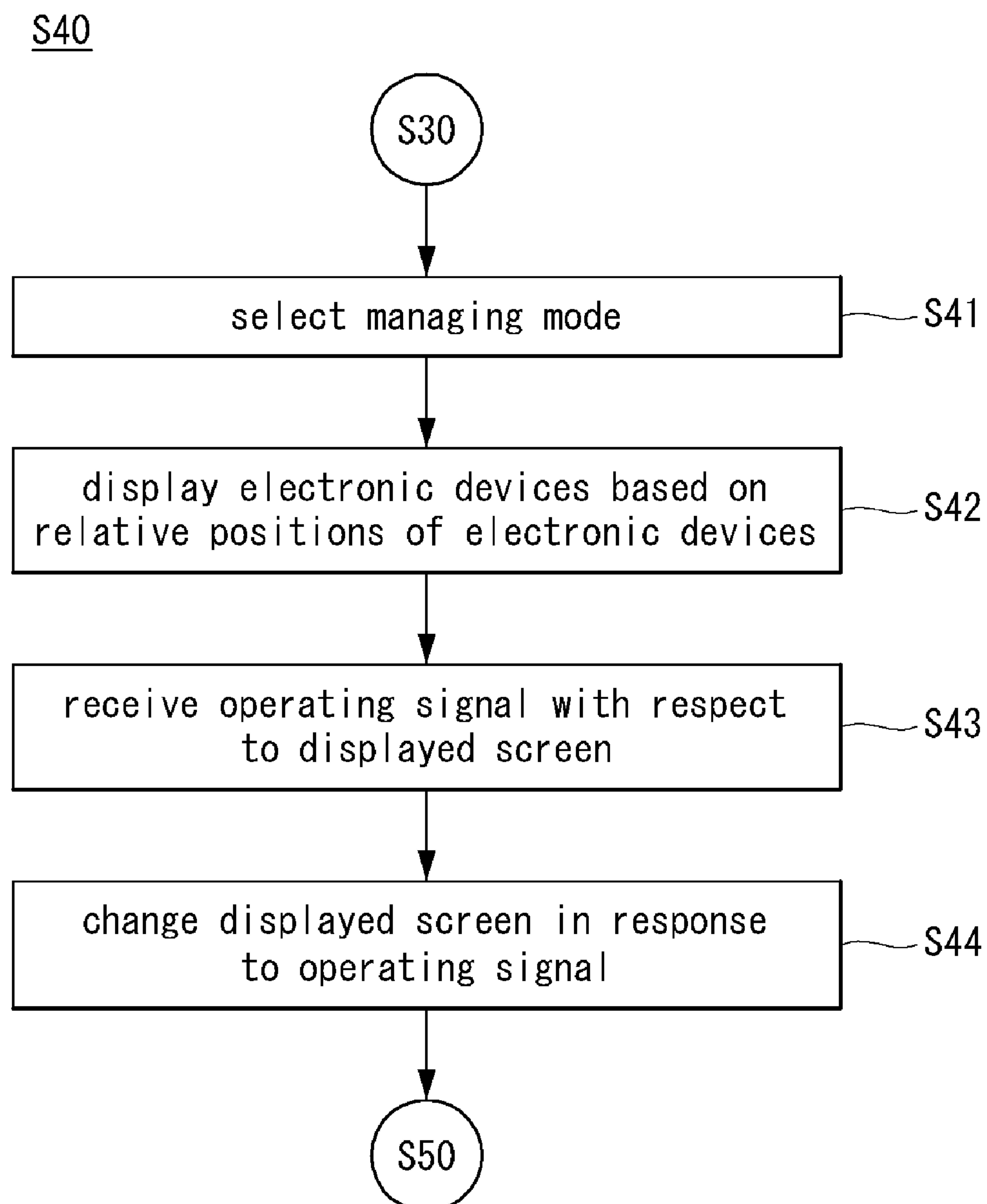
FIG. 13

FIG. 14

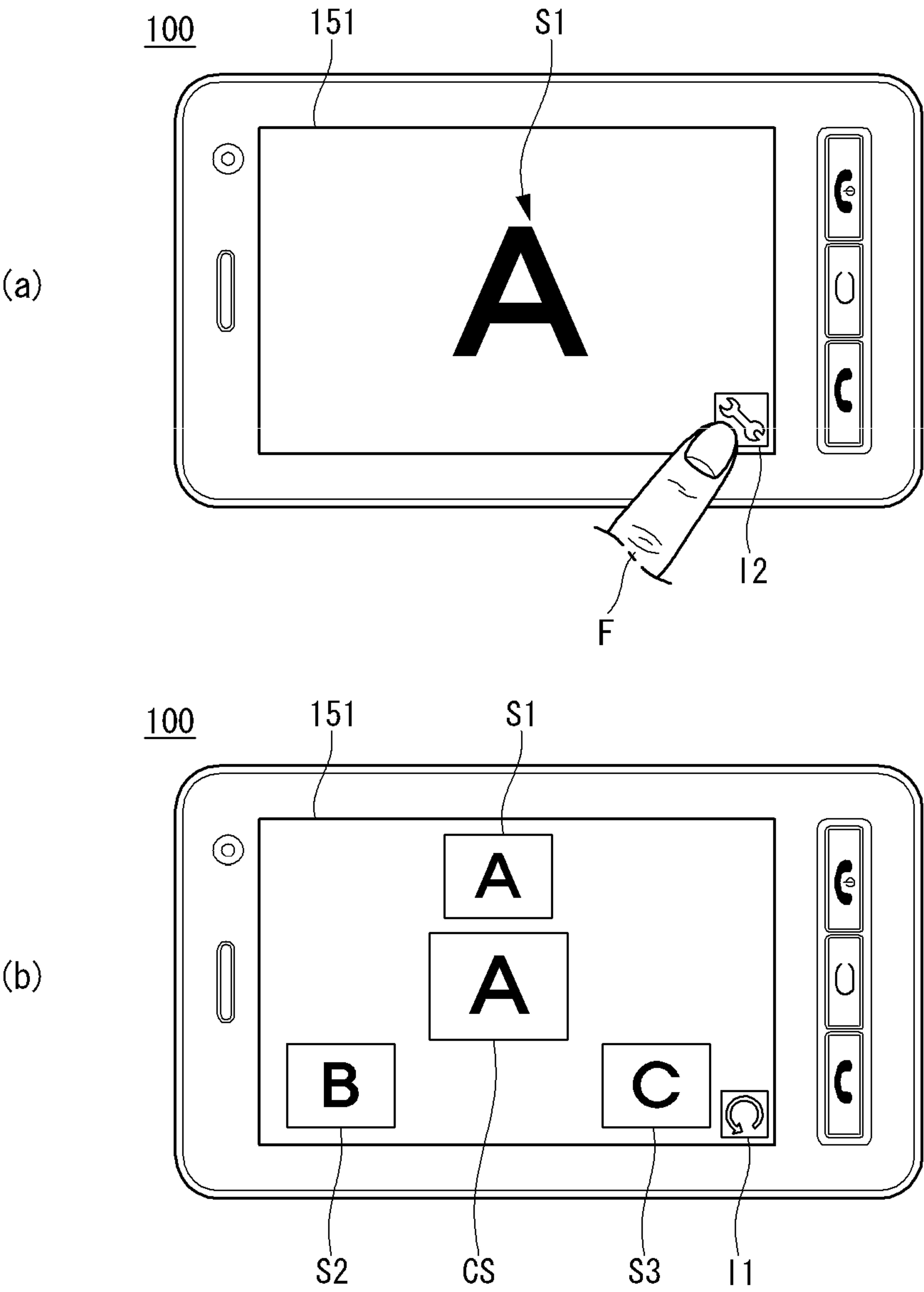


FIG. 15

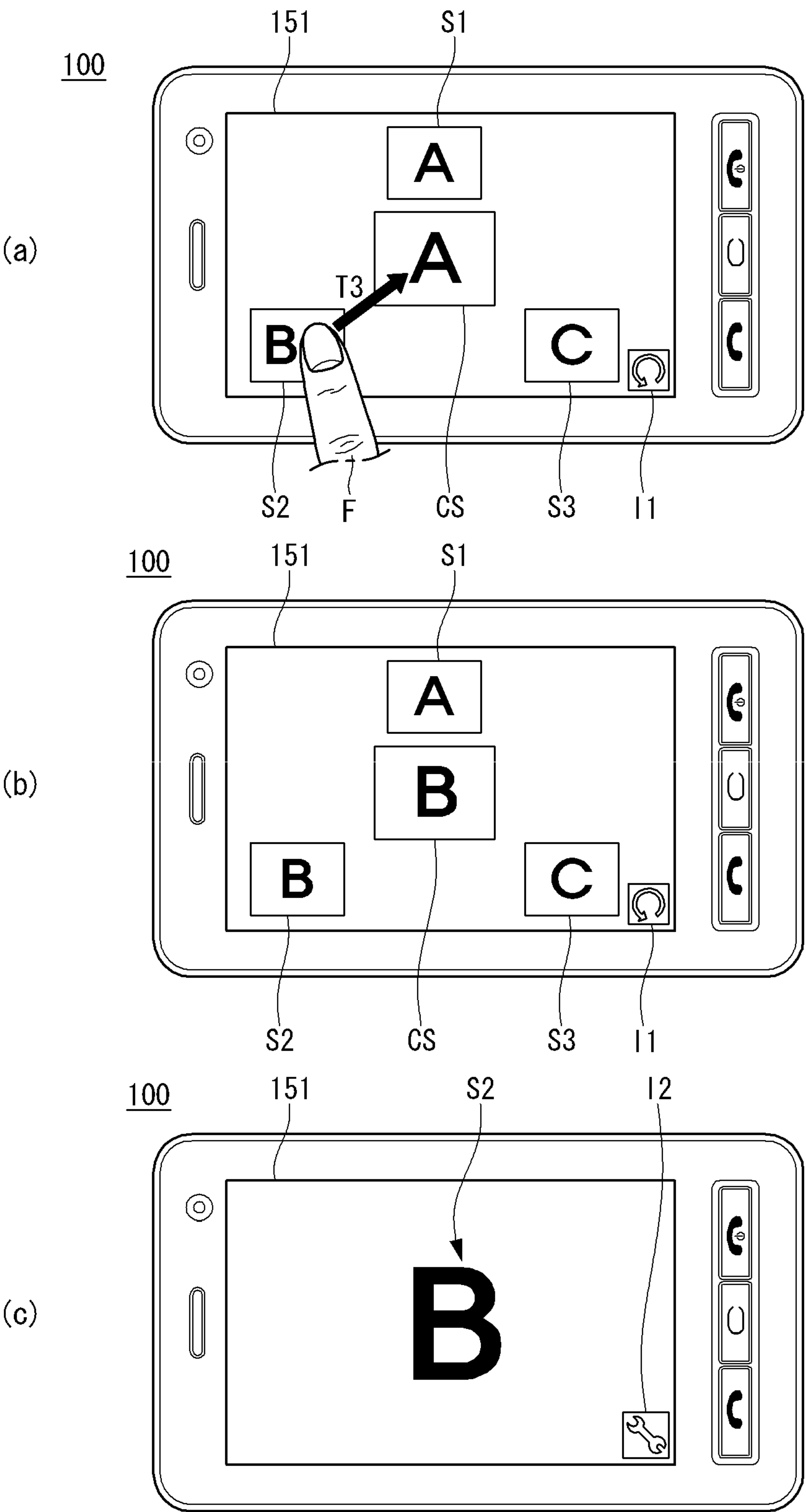


FIG. 16

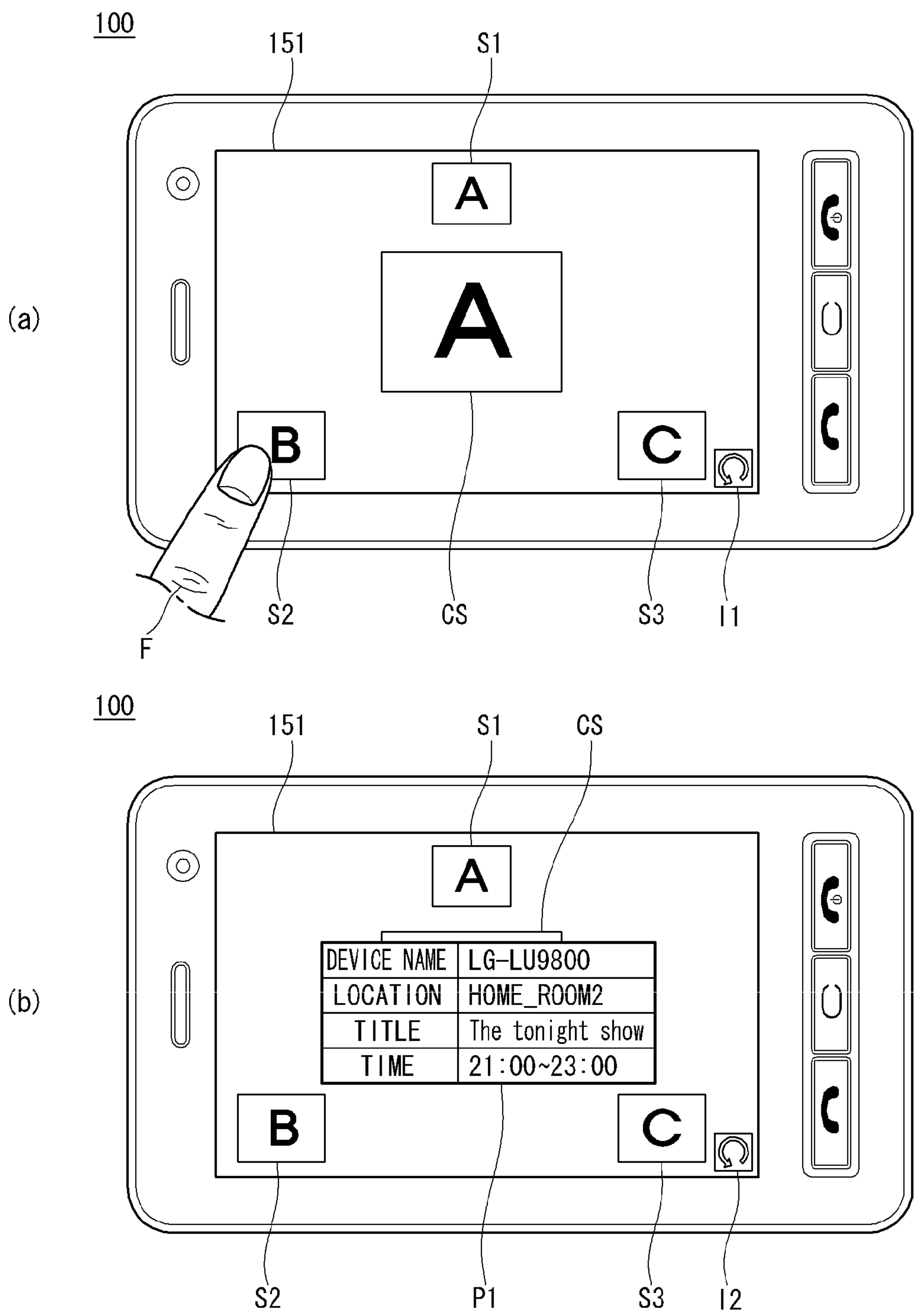


FIG. 17

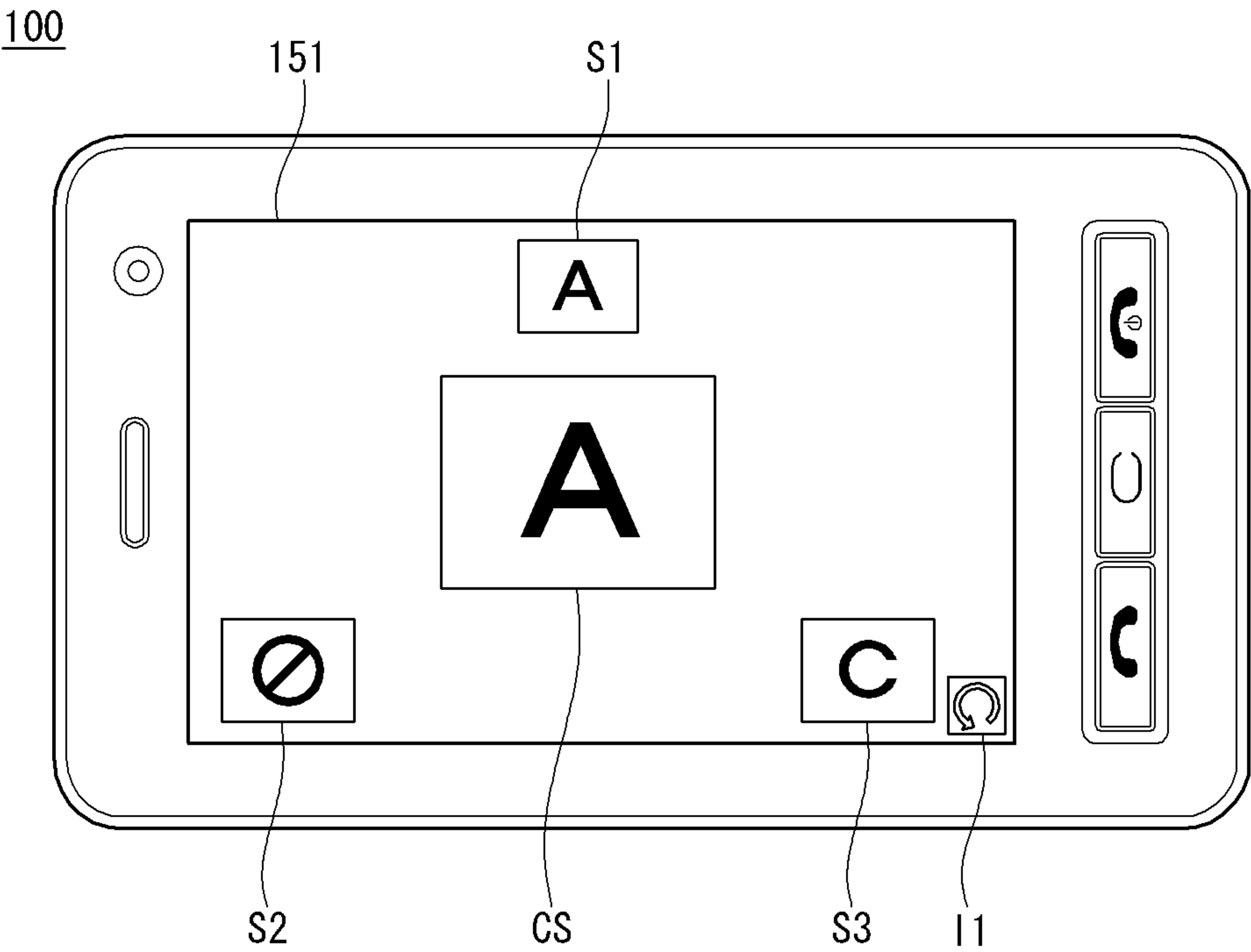


FIG. 18

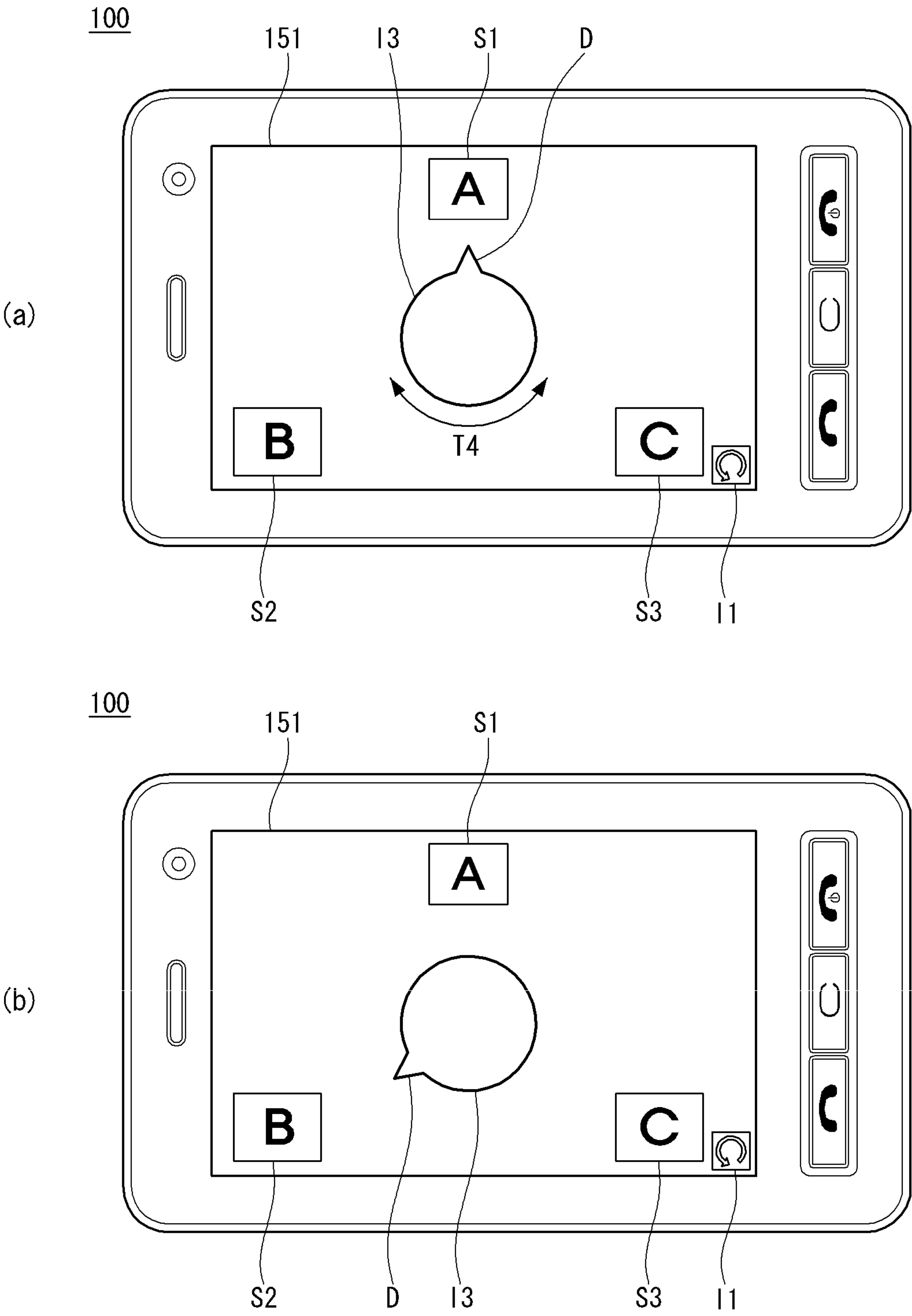


FIG. 19

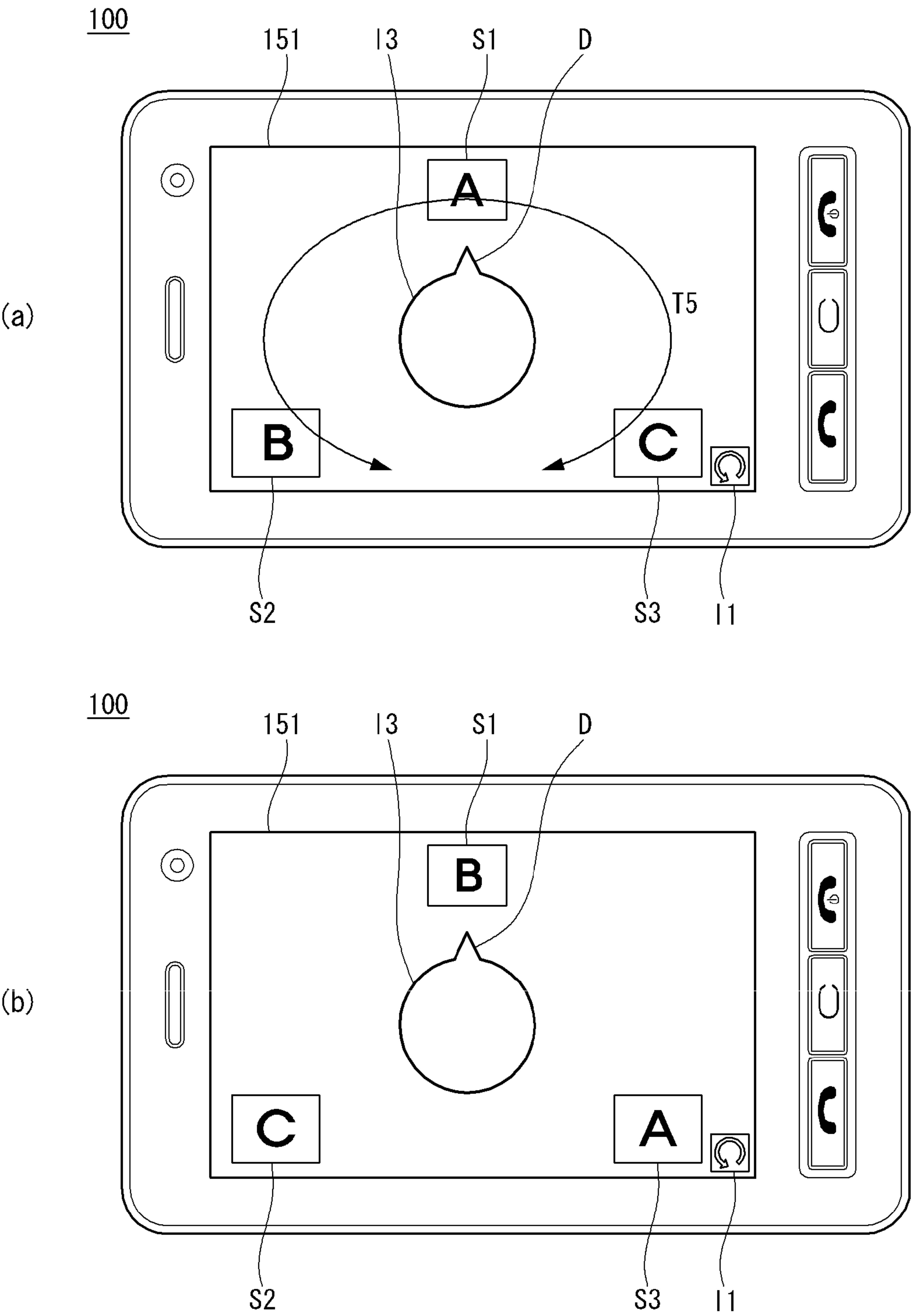


FIG. 20

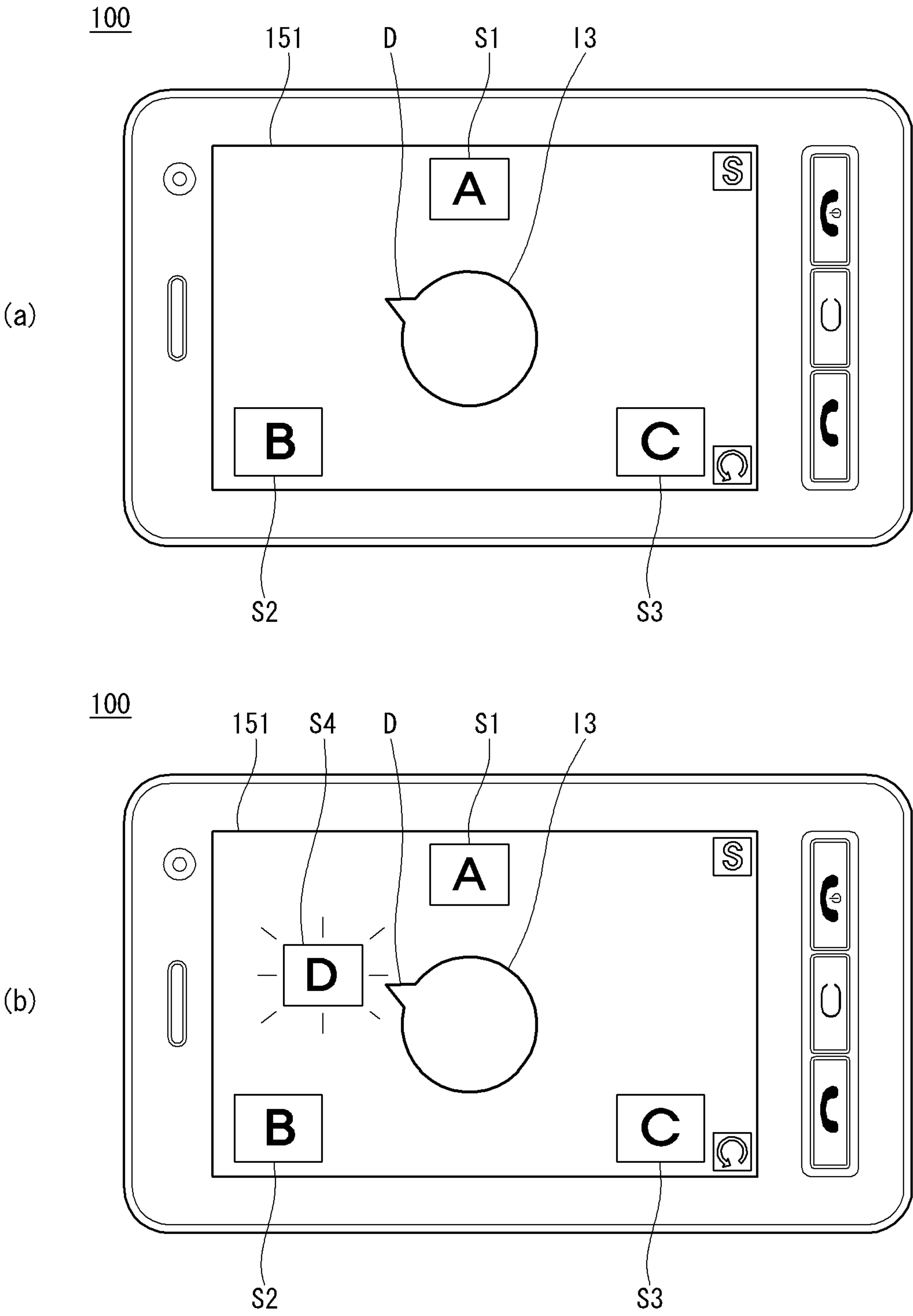


FIG. 21

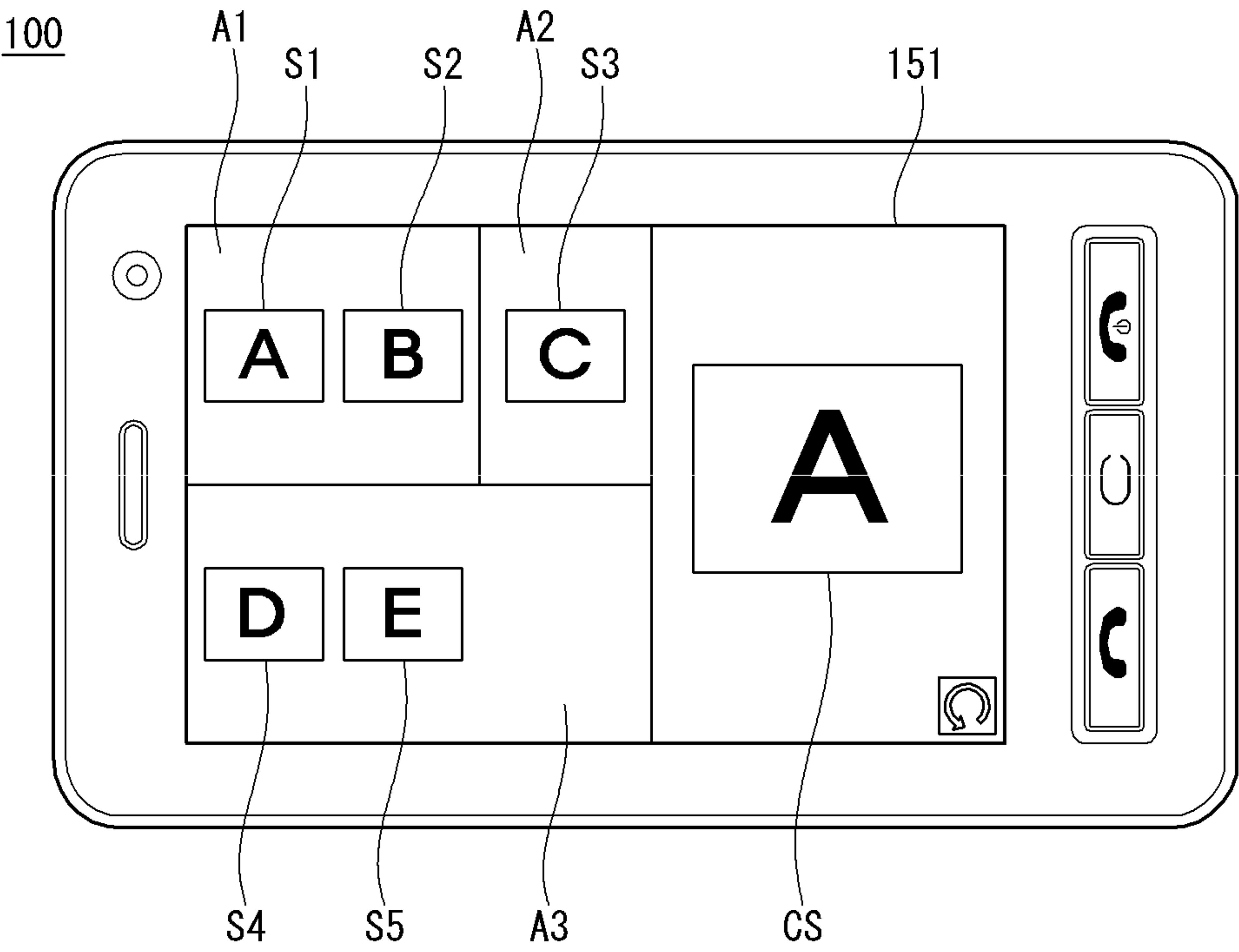


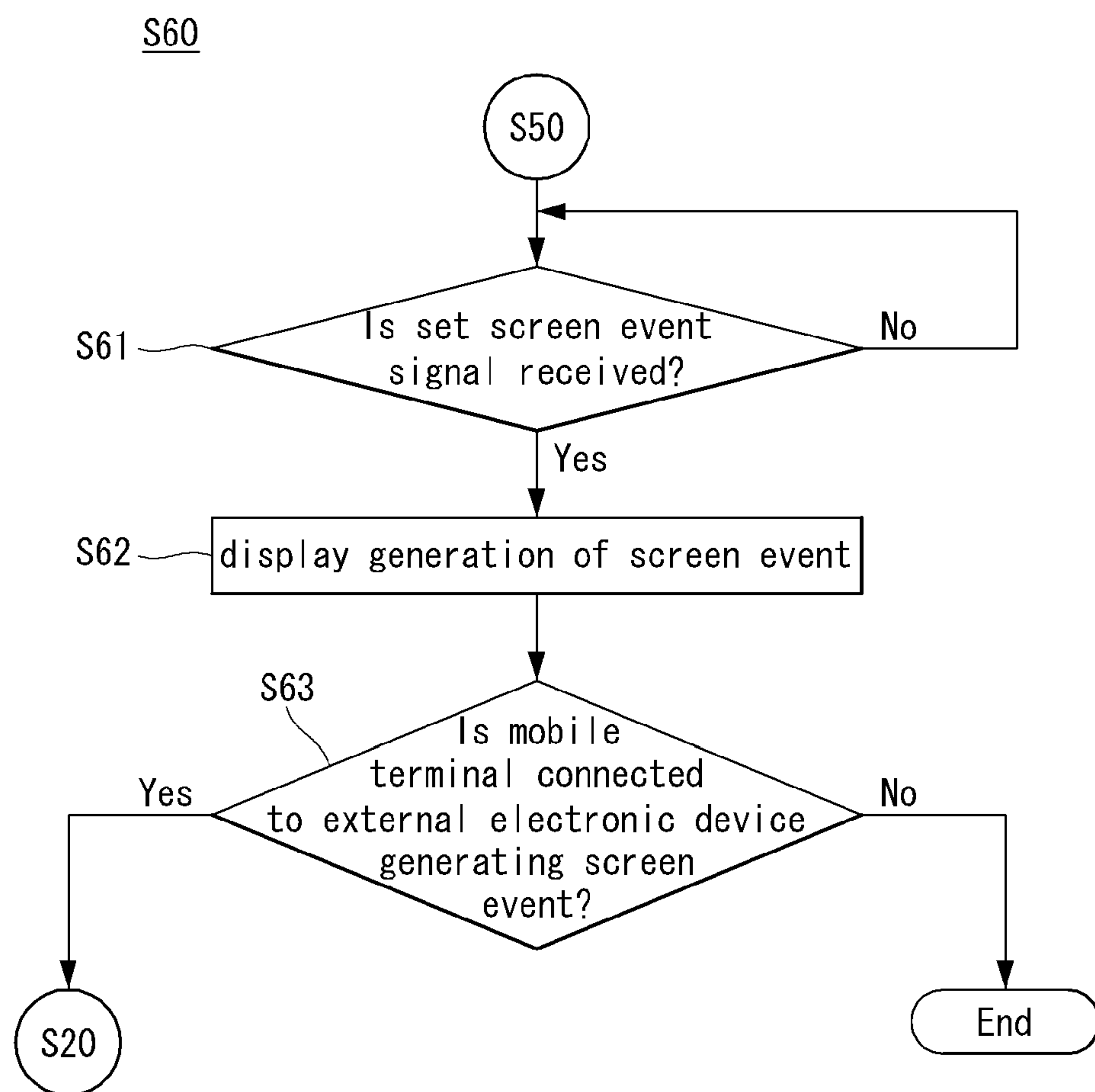
FIG. 22

FIG. 23

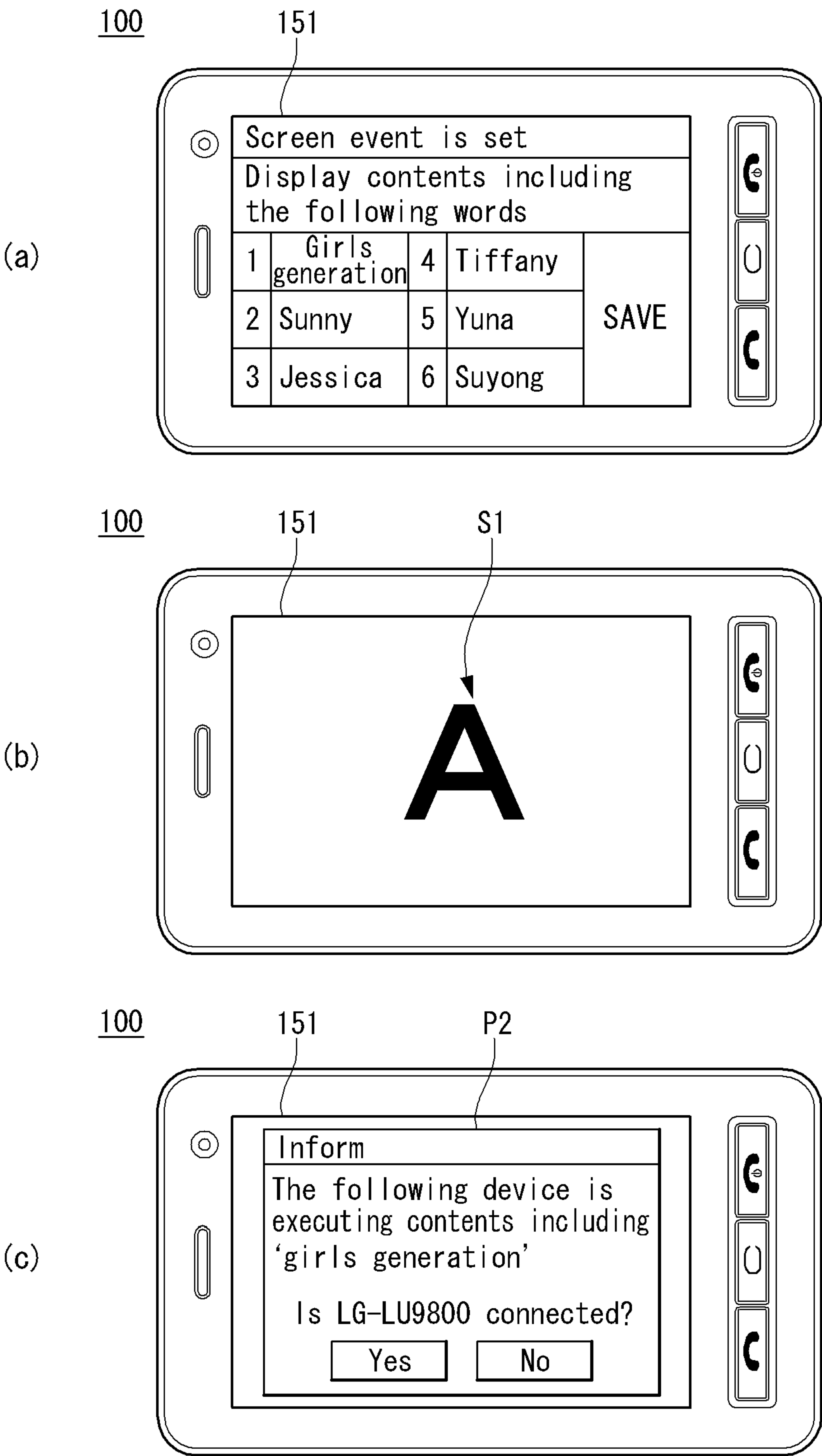


FIG. 24

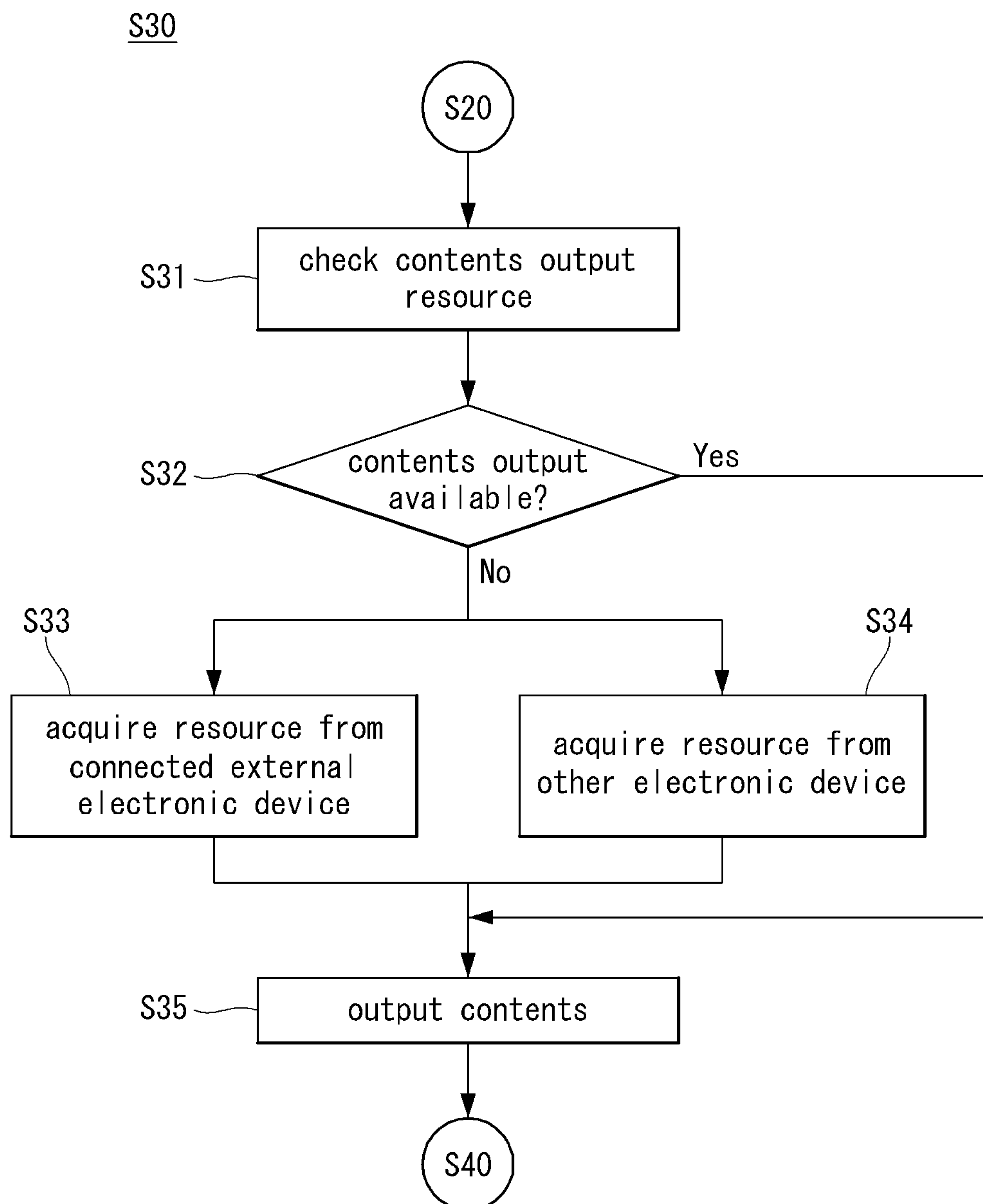
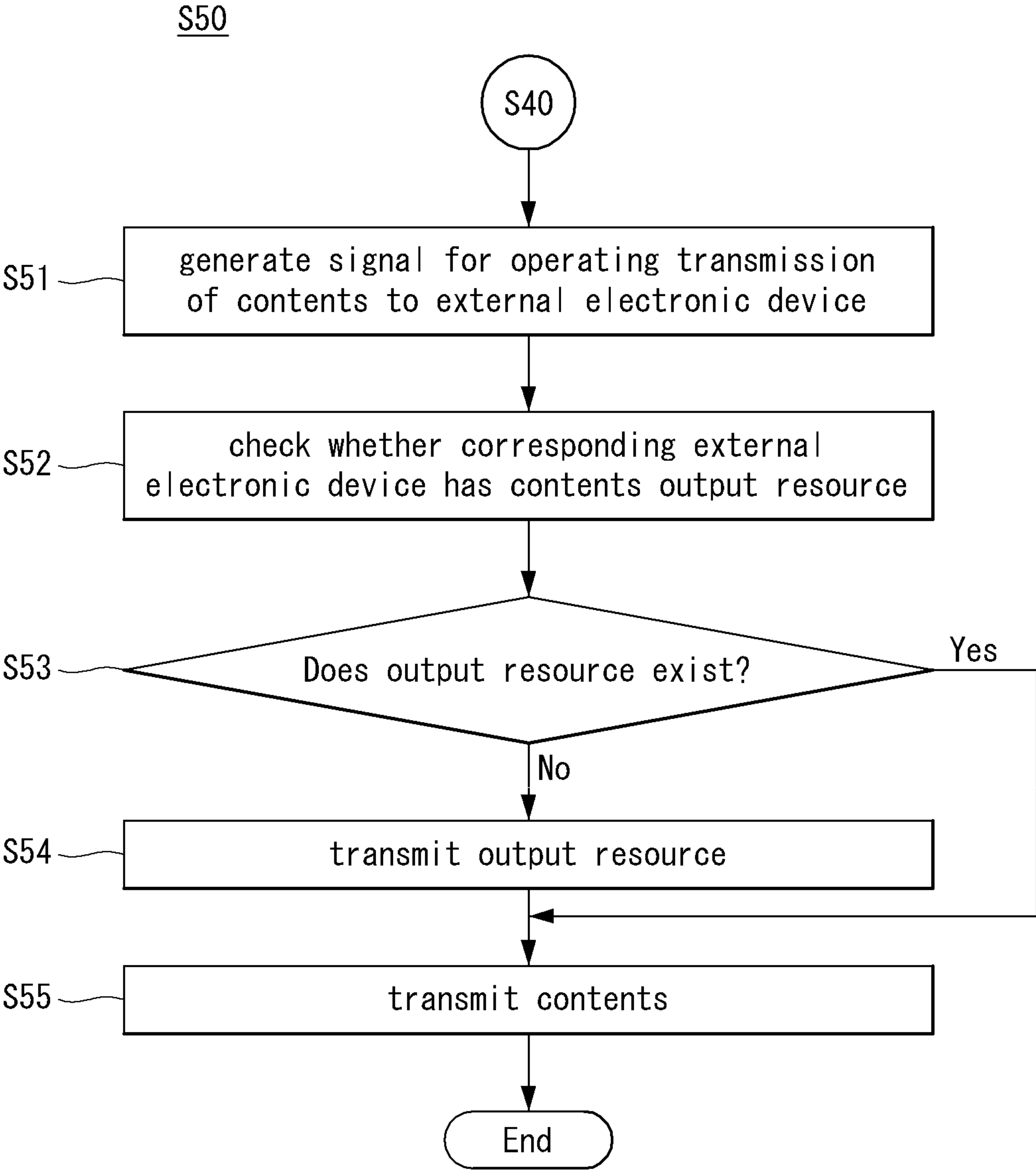


FIG. 25



1

MOBILE TERMINAL AND METHOD OF CONTROLLING THE SAME**CROSS REFERENCE TO RELATED APPLICATIONS**

Pursuant to 35 U.S.C. §119(a), this application claims the benefit of earlier filing date and right of priority to Korean Patent Application No. 10-2010-0042565 filed on May 6, 2010, the contents of which are hereby incorporated by reference herein in their entirety.

FIELD OF THE INVENTION

The present invention relates to a mobile terminal and a control method thereof and, more particularly, to a mobile terminal and a control method thereof to display widgets reflecting contents information received from other electronic devices.

DESCRIPTION OF THE RELATED ART

As the functions of terminals, such as personal computers, laptop computers, cellular phones and the like, are diversified, the terminals are constructed in the form of a multimedia player having multiple functions such as capturing pictures or moving images, playing music, moving image files and games, and receiving broadcasting programs.

Terminals can be divided into mobile terminals and stationary terminals. The mobile terminals can be classified into handheld terminals and vehicle mountable terminals according to their modes of mobility.

A variety of recent terminals including mobile terminals provide more complex and various functions. To support and enhance functions of a terminal, a structural part and/or a software part of the terminal need to be improved.

SUMMARY OF THE INVENTION

An aspect of this document is to provide a mobile terminal and a control method thereof to display widgets reflecting contents information received from other electronic devices.

According to an embodiment of the present invention, a mobile terminal includes a display, a communication unit receiving, from other electronic devices, information related to contents being executed at the other electronic devices, and a controller controlling displaying of widgets individually corresponding to a respective one of the electronic devices on the display. Each of the widgets displayed on the display of the mobile terminal represents information relating to contents that is being executed at a corresponding one of the other electronic devices.

According to another embodiment of the present invention, a method of controlling a mobile terminal includes communicating with other electronic devices, receiving contents information from the other electronic devices, the contents information being information related to contents that is being executed at the other electronic devices, and displaying, on a display of the mobile terminal, widgets individually corresponding to a respective one of the other electronic devices, each of the widgets representing contents information of a corresponding one of the other electronic devices.

BRIEF DESCRIPTION OF THE DRAWINGS

The implementation of the present invention will be described in detail with reference to the following drawings in which like numerals refer to like elements.

2

FIG. 1 is a block diagram of a mobile terminal according to an embodiment of the present invention.

FIG. 2A is a front perspective view of a mobile terminal according to an embodiment of present invention.

FIG. 2B is a rear perspective view of a mobile terminal according to an embodiment of the present invention.

FIGS. 2C and 2D illustrate various forms of mobile terminals and display screens according to various embodiments of the present invention.

FIG. 3 is a conceptual diagram illustrating a proximity depth of a proximity sensor according to an embodiment of the present invention.

FIG. 4 illustrates a configuration of a code division multiple access (CDMA) wireless communication system communicating with a mobile terminal according to an embodiment of the present invention.

FIG. 5 is a flowchart illustrating an operation of a mobile terminal according to an embodiment of the present invention.

FIGS. 6 and 7 illustrate communication between a mobile terminal and various external electronic devices according to an embodiment of the present invention.

FIGS. 8 and 9 illustrate operating a mobile terminal to acquire contents information from an external electronic device to output the contents information according to an embodiment of the present invention.

FIGS. 10(a)-12(b) illustrate operations of displaying contents information acquired by a mobile terminal and manipulating the displayed contents information according to various embodiments of the present invention.

FIG. 13 is a flowchart illustrating an operation of receiving an operating signal with respect to output contents information according to an embodiment of the present invention.

FIGS. 14(a)-19(b) illustrate operations of outputting contents information received from external electronic devices and controlling the external electronic devices based on the contents information according to various embodiments of the present invention.

FIG. 20 illustrates an operation of a mobile terminal to search for a new external device according to an embodiment of the present invention.

FIG. 21 illustrates a layout of external electronic devices searched by a mobile terminal according to an embodiment of the present invention.

FIG. 22 is a flowchart illustrating an operation of a mobile terminal which relates to a screen event according to an embodiment of the present invention.

FIG. 23 illustrates an operation relating to the screen event shown in FIG. 22.

FIGS. 24 and 25 are flowcharts illustrating an operation of a mobile terminal to share a contents output resource according to an embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention will now be described more fully with reference to the accompanying drawings, in which exemplary embodiments of the present invention are shown. The present invention may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the concept of the present invention to those skilled in the art.

In the following description, suffixes “module” and “unit” are given to components of the mobile terminal in consideration of only facilitation of description and do not have meanings or functions discriminated from each other. The mobile terminal described in the specification may include a cellular phone, a smart phone, a laptop computer, a digital broadcasting terminal, personal digital assistants (PDA), a portable multimedia player (PMP), a navigation system and so on.

FIG. 1 is a block diagram of a mobile terminal **100** according to an embodiment of the present invention. Other embodiments, configurations and arrangements may also be provided for the present invention. As shown in FIG. 1, the mobile terminal **100** may include a wireless communication unit **110**, an audio/video (A/V) input unit **120**, a user input unit **130**, a sensing unit **140**, an output unit **150**, a memory **160**, an interface unit **170**, a controller **180**, and a power supply **190**. Not all of the components shown in FIG. 1 may be essential parts and the number of components included in the mobile terminal **100** may be varied. The components of the mobile terminal **100** will now be described.

The wireless communication unit **110** may include at least one module that enables wireless communication between the mobile terminal **100** and a wireless communication system or between the mobile terminal **100** and a network in which the mobile terminal **100** is located. For example, the wireless communication unit **110** may include a broadcast receiving module **111**, a mobile communication module **112**, a wireless Internet module **113**, a local area or short-range communication module **114**, and a position-location module **115**.

The broadcast receiving module **111** may receive broadcast signals and/or broadcast related information from an external broadcast management server through a broadcast channel. The broadcast channel may include a satellite channel and a terrestrial channel, and the broadcast management server may be a server that generates and transmits broadcast signals and/or broadcast related information or a server that receives previously created broadcast signals and/or broadcast related information and transmits the broadcast signals and/or broadcast related information to a terminal.

The broadcast signals may include not only TV broadcast signals, radio broadcast signals, and data broadcast signals, but also signals in the form of a combination of a TV broadcast signal and a radio broadcast signal. The broadcast related information may be information on a broadcast channel, a broadcast program or a broadcast service provider, and may be provided even through a mobile communication network. In the latter case, the broadcast related information may be received by the mobile communication module **112**.

The broadcast related information may exist in various forms. For example, the broadcast related information may exist in the form of an electronic program guide (EPG) of a digital multimedia broadcasting (DMB) system or in the form of an electronic service guide (ESG) of a digital video broadcast-handheld (DVB-H) system.

The broadcast receiving module **111** may receive broadcast signals using various broadcasting systems. More particularly, the broadcast receiving module **111** may receive digital broadcast signals using digital broadcasting systems such as a digital multimedia broadcasting-terrestrial (DMB-T) system, a digital multimedia broadcasting-satellite (DMB-S) system, a media forward link only (MediaFLO) system, a DVB-H and integrated services digital broadcast-terrestrial (ISDB-T) systems. The broadcast receiving module **111** may receive signals from broadcasting systems providing broadcast signals other than the above-described digital broadcast systems.

The broadcast signals and/or broadcast related information received through the broadcast receiving module **111** may be stored in the memory **160**. The mobile communication module **112** may transmit/receive a radio signal to/from at least one of a base station, an external terminal and a server on a mobile communication network. The radio signal may include a voice call signal, a video telephony call signal or data in various forms according to transmission and reception of text/multimedia messages.

The wireless Internet module **113** may correspond to a module for wireless Internet access and may be included in the mobile terminal **100** or may be externally attached to the mobile terminal **100**. Wireless LAN (WLAN or Wi-Fi), wireless broadband (Wibro), world interoperability for microwave access (Wimax), high speed downlink packet access (HSDPA) and so on may be used as a wireless Internet technique.

The short-range communication module **114** may correspond to a module for local area communication. Further, Bluetooth®, radio frequency identification (RFID), infrared data association (IrDA), ultra wideband (UWB) and/or Zig-Bee® may be used as a local area communication technique.

The position-location module **115** may confirm or obtain the position of the mobile terminal **100**. The position-location module **115** may obtain position information by using a global navigation satellite system (GNSS). The GNSS is a terminology describing a radio navigation satellite system that revolves around the earth and transmits reference signals to predetermined types of radio navigation receivers such that the radio navigation receivers can determine their positions on the earth's surface or near the earth's surface. The GNSS may include a global positioning system (GPS) of the United States, Galileo of Europe, a global orbiting navigational satellite system (GLONASS) of Russia, COMPASS of China, and a quasi-zenith satellite system (QZSS) of Japan among others.

A global positioning system (GPS) module is a representative example of the position-location module **115**. The GPS module may calculate information on distances between one point or object and at least three satellites and information on a time when the distance information is measured and apply trigonometry to the obtained distance information to obtain three-dimensional position information on the point or object according to latitude, longitude and altitude at a predetermined time.

A method of calculating position and time information using three satellites and correcting the calculated position and time information using another satellite may also be used. In addition, the GPS module may continuously calculate the current position in real time and calculate velocity information using the location or position information.

As shown in FIG. 1, the A/V input unit **120** may input an audio signal or a video signal and include a camera **121** and a microphone **122**. The camera **121** may process image frames of still images or moving images obtained by an image sensor in a video telephony mode or a photographing mode. The processed image frames may be displayed on a display module **151** which may be a touch screen.

The image frames processed by the camera **121** may be stored in the memory **160** or may be transmitted to an external device through the wireless communication unit **110**. The mobile terminal **100** may also include at least two cameras **121**.

The microphone **122** may receive an external audio signal in a call mode, a recording mode or a speech recognition mode and process the received audio signal into electric audio data. The audio data may then be converted into a form that

5

can be transmitted to a mobile communication base station through the mobile communication module **112** and output in the call mode. The microphone **122** may employ various noise removal algorithms (or noise canceling algorithm) for removing or reducing noise generated when the external audio signal is received.

The user input unit **130** may receive input data for controlling operation of the mobile terminal **100** from a user. The user input unit **130** may include a keypad, a dome switch, a touch pad (constant voltage/capacitance), a jog wheel, a jog switch and so on.

The sensing unit **140** may sense a current state of the mobile terminal **100**, such as an open/close state of the mobile terminal **100**, a position of the mobile terminal **100**, whether a user touches the mobile terminal **100**, a direction of the mobile terminal **100**, and acceleration/deceleration of the mobile terminal **100**, and generate a sensing signal for controlling operation of the mobile terminal **100**. For example, in case of a slide phone, the sensing unit **140** may sense whether the slide phone is opened or closed. Further, the sensing unit **140** may sense whether the power supply **190** supplies power and/or whether the interface unit **170** is connected to an external device. The sensing unit **140** may also include a proximity sensor **141** (not shown in the drawings).

The output unit **150** may generate visual, auditory and/or tactile output and may include the display module **151**, an audio output module **152**, an alarm unit **153** and a haptic module **154**. The display module **151** may display information processed by the mobile terminal **100**. The display module **151** may display a user interface (UI) or a graphic user interface (GUI) related to a telephone call when the mobile terminal **100** is in the call mode. The display module **151** may also display a captured and/or received image, a UI or a GUI when the mobile terminal **100** is in the video telephony mode or the photographing mode.

In addition, the display module **151** may include at least one of a liquid crystal display, a thin film transistor liquid crystal display, an organic light-emitting diode display, a flexible display and a three-dimensional display. Some of these displays may be of a transparent type or a light transmissive type. That is, the display module **151** may include a transparent display module.

The transparent display module may include a transparent liquid crystal display. The rear structure of the display module **151** may also be of a light transmissive type. Accordingly, a user may see an object located behind the body of the mobile terminal **100** through the transparent area of the body of the mobile terminal **100** that is occupied by the display module **151**.

The mobile terminal **100** may also include at least two display modules **151**. For example, the mobile terminal **100** may include a plurality of display modules **151** that are arranged on a single face at a predetermined distance or integrated displays. The plurality of display modules **151** may also be arranged on different sides.

Further, when the display module **151** and a sensor sensing touch (hereafter referred to as a touch sensor) form a layered structure that is referred to as a touch screen, the display module **151** may be used as an input device in addition to an output device. The touch sensor may be in the form of a touch film, a touch sheet, and a touch pad, for example.

The touch sensor may convert a variation in pressure applied to a specific portion of the display module **151** or a variation in capacitance generated at a specific portion of the display module **151** into an electric input signal. The touch sensor may sense pressure of touch as well as position and area of the touch.

6

When the user applies a touch input to the touch sensor, a signal corresponding to the touch input may be transmitted to a touch controller. The touch controller may then process the signal and transmit data corresponding to the processed signal to the controller **180**. Accordingly, the controller **180** may detect a touched portion of the display module **151**.

The proximity sensor **141** of the sensing unit **140** may be located in an internal region of the mobile terminal **100**, surrounded by the touch screen, or near the touch screen. The proximity sensor **141** may sense an object approaching a predetermined sensing face or an object located near the proximity sensor using an electromagnetic force or infrared rays without having mechanical contact. The proximity sensor **141** may have a lifetime longer than a contact sensor and may thus have a wide application in the mobile terminal **100**.

The proximity sensor **141** may include a transmission type photo-electric sensor, a direct reflection type photo-electric sensor, a mirror reflection type photo-electric sensor, a high-frequency oscillating proximity sensor, a capacitive proximity sensor, a magnetic proximity sensor, and/or an infrared proximity sensor. A capacitive touch screen may be constructed such that proximity of a pointer is detected through a variation in an electric field according to the proximity of the pointer. The touch screen (touch sensor) may be classified as a proximity sensor **141**.

For ease of convenience of explanation, an action of the pointer approaching the touch screen without actually touching the touch screen may be referred to as a "proximity touch" and an action of bringing the pointer into contact with the touch screen may be referred to as a "contact touch." The proximity touch point of the pointer on the touch screen may correspond to a point of the touch screen at which the pointer is perpendicular to the touch screen.

The proximity sensor **141** may sense the proximity touch and a proximity touch pattern (e.g., a proximity touch distance, a proximity touch direction, a proximity touch velocity, a proximity touch time, a proximity touch position, a proximity touch moving state, and the like). Information corresponding to the sensed proximity touch action and proximity touch pattern may then be displayed on the touch screen.

The audio output module **152** may output audio data received from the wireless communication unit **110** or stored in the memory **160** in a call signal receiving mode, a telephone call mode or a recording mode, a speech recognition mode and a broadcasting receiving mode. The audio output module **152** may output audio signals related to functions, such as a call signal incoming tone and a message incoming tone, performed in the mobile terminal **100**. The audio output module **152** may include a receiver, a speaker, a buzzer, and the like. The audio output module **152** may output sounds through an earphone jack. The user may hear the sounds by connecting an earphone to the earphone jack.

The alarm unit **153** may output a signal for indicating generation of an event of the mobile terminal **100**. For example, alarms may be generated when receiving a call signal, receiving a message, inputting a key signal, or inputting touch. The alarm unit **153** may also output signals in forms different from video signals or audio signals, for example, a signal for indicating generation of an event through vibration. The video signals or the audio signals may also be output through the display unit **151** or the audio output module **152**.

The haptic module **154** may generate various haptic effects that the user can feel. One example of the haptic effects is vibration. The intensity and/or pattern of vibration generated

by the haptic module **154** may also be controlled. For example, different vibrations may be combined and output or may be sequentially output.

The haptic module **154** may generate a variety of haptic effects including an effect of stimulus according to an arrangement of pins vertically moving against a contact skin surface, an effect of stimulus according to a jet force or sucking force of air through a jet hole or a sucking hole, an effect of stimulus of rubbing the skin, an effect of stimulus according to contact of an electrode, an effect of stimulus using an electrostatic force, and an effect according to a reproduction of cold and warmth using an element capable of absorbing or radiating heat in addition to vibrations.

The haptic module **154** may not only transmit haptic effects through direct contact but may also allow the user to feel haptic effects through a kinesthetic sense of the user's fingers or arms. The mobile terminal **100** may also include a plurality of haptic modules **154**.

The memory **160** may store a program for operation of the controller **180** and temporarily store input/output data such as a phone book, messages, still images, and/or moving images. The memory **160** may also store data about vibrations and sounds in various patterns that are output from when a touch input is applied to the touch screen.

The memory **160** may include at least a flash memory, a hard disk type memory, a multimedia card micro type memory, a card type memory, such as SD or XD memory, a random access memory (RAM), a static RAM (SRAM), a read-only memory (ROM), an electrically erasable programmable ROM (EEPROM), a programmable ROM (PROM) magnetic memory, a magnetic disk or an optical disk. The mobile terminal **100** may also operate in relation to a web storage performing the storing function of the memory **160** on the Internet.

The interface unit **170** may serve as a path to external devices connected to the mobile terminal **100**. The interface unit **170** may receive data from the external devices or power and transmit the data or power to internal components of the mobile terminal **100** or transmit data of the mobile terminal **100** to the external devices. For example, the interface unit **170** may include a wired/wireless headset port, an external charger port, a wired/wireless data port, a memory card port, a port for connecting a device having a user identification module, an audio I/O port, a video I/O port, and/or an ear-phone port.

The interface unit **170** may also interface with a user identification module that is a chip that stores information for authenticating authority to use the mobile terminal **100**. For example, the user identification module may be a user identify module (UIM), a subscriber identify module (SIM) and a universal subscriber identify module (USIM). An identification device including the user identification module may also be manufactured in the form of a smart card. Accordingly, the identification device may be connected to the mobile terminal **100** through a port of the interface unit **170**.

The interface unit **170** may also be a path through which power from an external cradle is provided to the mobile terminal **100** when the mobile terminal **100** is connected to the external cradle or a path through which various command signals input by the user through the cradle are transmitted to the mobile terminal **100**. The various command signals or power input from the cradle may be used as signals for confirming whether the mobile terminal **100** is correctly set in the cradle.

The controller **180** may control overall operations of the mobile terminal **100**. For example, the controller **180** may perform control and processing for voice communication,

data communication and/or video telephony. The controller **180** may also include a multimedia module **181** for playing multimedia. The multimedia module **181** may be included in the controller **180** as shown in FIG. 1 or may be separated from the controller **180**.

The controller **180** may perform a pattern recognition process capable of recognizing handwriting input or picture-drawing input applied to the touch screen as characters or images. The power supply **190** may receive external power and internal power and provide power required for operations of the components of the mobile terminal **100** under control of the controller **180**.

According to hardware implementation, embodiments of the present disclosure may be implemented using at least one of application specific integrated circuits (ASICs), digital signal processors (DSPs), digital signal processing devices (DSPDs), programmable logic devices (PLDs), field programmable gate arrays (FPGAs), processors, controllers, micro-controllers, microprocessors, and/or electrical units for executing functions. The embodiments may be implemented by the controller **180**.

According to software implementation, embodiments such as procedures or functions may be implemented with a separate software module executing at least one function or operation. Software codes may be implemented according to a software application written in an appropriate software language. The software codes may be stored in the memory **160** and executed by the controller **180**.

FIG. 2A is a front perspective view of a mobile terminal or a handheld terminal **100** according to an embodiment of the present invention. For example, the handheld terminal **100** has a bar type terminal body. However, the present invention is not limited to a bar type terminal and can be applied to terminals of various types including a slide type, a folder type, a swing type and a swivel type terminal having at least two bodies that are relatively movably combined.

The terminal body includes a case (a casing, a housing, or a cover) forming the exterior of the terminal **100**. In the present embodiment, the case can be divided into a front case **101** and a rear case **102**. Various electronic components are arranged in the space formed between the front case **101** and the rear case **102**. At least one middle case can be additionally arranged between the front case **101** and the rear case **102**.

The cases can be formed of plastics through injection molding or made of a metal material such as stainless steel (STS) or titanium (Ti).

The display module **151**, the audio output module **152**, the camera **121**, the user input unit **130** including operating units **131** and **132**, the microphone **122** and the interface unit **170** can be arranged in the terminal body, specifically, in the front case **101**.

The display module **151** occupies most part of the main face of the front case **101**. The audio output module **152** and the camera **121** are arranged in a region in proximity to one of both ends of the display module **151** and the operating unit **131** and the microphone **122** are located in a region in proximity to the other end of the display unit **151**. The operating unit **132** and the interface unit **170** are arranged on the sides of the front case **101** and the rear case **102**.

The user input unit **130** is operated to receive commands for controlling the operation of the handheld terminal **100** and can include a plurality of operating units **131** and **132**. The operating units **131** and **132** can be referred to as manipulating portions and employ any tactile manner in which a user operates the operating units **131** and **132** while having tactile feeling.

First and second operating units **131** and **132** can receive various inputs. For example, the first operating unit **131** receives commands such as start, end and scroll and the second operating unit **132** receives commands such as control of the volume of sound output from the audio output module **152** or conversion of the display module **151** to a touch recognition mode.

FIG. 2B is a rear perspective view of the handheld terminal shown in FIG. 2A according to an embodiment of the present invention.

Referring to FIG. 2B, a camera **121'** can be additionally attached to the rear side of the terminal body, that is, the rear case **102**. The camera **121'** has a photographing direction opposite to that of the camera **121** shown in FIG. 2A and can have pixels different from those of the camera **121** shown in FIG. 2A.

For example, it is desirable that the camera **121** has low pixels such that it can capture an image of the face of a user and transmit the image to a receiving part in case of video telephony while the camera **121'** has high pixels because it captures an image of a general object and does not immediately transmit the image in many cases. The cameras **121** and **121'** can be attached to the terminal body such that they can be rotated or pop-up.

A flash bulb **123** and a mirror **124** are additionally arranged in proximity to the camera **121'**. The flash bulb **123** lights an object when the camera **121'** takes a picture of the object. The mirror **124** is used for the user to look at his/her face in the mirror when the user wants to self-photograph himself/herself using the camera **121'**.

An audio output module **152'** can be additionally provided on the rear side of the terminal body. The audio output module **152'** can achieve a stereo function with the audio output module **152** shown in FIG. 2A and be used for a speaker phone mode when the mobile terminal **100** is used for a telephone call.

A broadcast signal receiving antenna can be additionally attached to the side of the terminal body in addition to an antenna for telephone calls. The antenna constructing a part of the broadcast receiving module **111** shown in FIG. 1 can be set in the terminal body such that the antenna can be pulled out of the terminal body.

The power supply **190** for providing power to the handheld terminal **100** is set in the terminal body. The power supply **190** can be included in the terminal body or detachably attached to the terminal body.

A touch pad **135** for sensing touch can be additionally attached to the rear case **102**. The touch pad **135** can be of a light transmission type as the display module **151**. In this case, if the display module **151** outputs visual information through both sides thereof, the visual information can be recognized through the touch pad **135**. The information output through both sides of the display module **151** can be controlled by the touch pad **135**. Otherwise, a display is additionally attached to the touch pad **135** such that a touch screen can also be arranged in the rear case **102**.

The touch pad **135** operates in connection with the display module **151** of the front case **101**. The touch pad **135** can be located in parallel with the display module **151** behind the display module **151**. The touch panel **135** can be identical to or smaller than the display module **151** in size.

FIGS. 2C and 2D illustrate the mobile terminal **100** and the display unit **151** according to various embodiments of the present invention.

Referring to FIG. 2C, the display module **151** can include a first display and a second display which are physically separated from each other. In a folder type or slide type

mobile terminal having two bodies connected through a hinge or slide, the first display (or main display) can be formed on the inner face or outer face of one of the bodies and the second display (or sub display) can be formed on the inner face or outer face of the other body. The sub display is separated from the mobile terminal and detachably combined with the mobile terminal body through an interface to display data from the mobile terminal **100**.

The display module **151** can include first and second displays which are logically separated from each other in a display panel, as illustrated in FIG. 2D.

FIG. 3 is a conceptual diagram for explaining a proximity depth of the proximity sensor **141**. As shown in FIG. 3, when a pointer such as a user's finger approaches the touch screen, the proximity sensor **141** located inside or near the touch screen senses the approach and outputs a proximity signal. The proximity sensor **141** can be constructed such that it outputs a proximity signal according to the distance between the pointer approaching the touch screen and the touch screen (referred to as "proximity depth").

The distance in which the proximity signal is output when the pointer approaches the touch screen is referred to as a detection distance. The proximity depth can be known by using a plurality of proximity sensors **141** having different detection distances and comparing proximity signals respectively output from the proximity sensors **141**.

FIG. 3 shows the section of the touch screen in which proximity sensors **141** capable of sensing three different proximity depths are arranged. Proximity sensors **141** capable of sensing less than three or more than four proximity depths can be arranged in the touch screen.

Specifically, when the pointer completely comes into contact with the touch screen (D0), it is recognized as contact touch. When the pointer is located within a distance D1 from the touch screen, it is recognized as proximity touch of a first proximity depth. When the pointer is located in a range between the distance D1 and a distance D2 from the touch screen, it is recognized as proximity touch of a second proximity depth. When the pointer is located in a range between the distance D2 and a distance D3 from the touch screen, it is recognized as proximity touch of a third proximity depth. When the pointer is located at longer than the distance D3 from the touch screen, it is recognized as cancellation of proximity touch.

Accordingly, the controller **180** can recognize the proximity touch as various input signals according to the proximity distance and proximity position of the pointer with respect to the touch screen and perform various operation controls according to the input signals.

Referring to FIG. 4, a CDMA wireless communication system includes mobile terminals **100**, base stations **270**, base station controllers **275**, and a mobile switching center **280**. The mobile switching center **280** is connected to a public switch telephone network (PSTN) **290**. The mobile switching center **280** is connected to the base station controllers **275**. The base station controllers **275** are connected to the base stations **270** through backhaul lines. The backhaul lines may be constructed according to E1/T1, ATM, IP, PPP, frame relay, HDSL, ADSL or xDSL well-known in the art. The CDMA wireless communication system may include at least two base station controllers **275**.

Each base station **270** may include a sector or sectors and each sector may include an omnidirectional antenna or an antenna adjusted to a specific radiation direction from the base station **270**. Otherwise, each sector may include two diversity reception antennas. Each base station **270** is constructed to have frequency assignments, and the frequency

11

assignments may have specific spectra (for example, 1.25 MHz and 5 MHz). Intersection of sectors and frequency assignments may be referred to a CDMA channel.

The base stations **270** may be referred to as base station transceiver subsystems (BTSs). “Base station” may be used as a term that collectively designates the base station controller **275** and one or more base stations **270** in several examples. Furthermore, the base stations **270** may be referred to as “cell sites”. Otherwise, individual sectors of a given base station **270** may be referred to as cell sites.

A terrestrial DMB transmitter **295** can transmit broadcast signals to the mobile terminals **100** operating in the CDMA wireless communication system. The broadcast receiving module **111** of each mobile terminal **100** is constructed to receive the broadcast signals transmitted from the DMB transmitter **295**. This can be similarly applied to different types of broadcast and multicast signaling as described above.

FIG. 4 illustrates global positioning system (GPS) satellites **300**. These satellites **300** can track the positions of some or all of the mobile terminals **100**. Although two satellites are shown in FIG. 4, position information can be obtained from less than or more than two satellites. In addition, other position-tracking techniques (for example, position-tracking techniques that can substitute for GPS technique or can be added to the GPS technique) can be used. If required, some or all of the GPS satellites **300** can support satellite DMB transmission separately or additionally.

When the CDMA wireless communication system operates, the base stations **270** receive reverse link signals from the mobile terminals **100**. The mobile terminals **100** may be in a state that the mobile terminals **100** are making calls, sending messages or performing other communications. The reverse link signals received by the base stations **270** are processed by the base stations **270**. The processed data is transmitted to the base station controllers **275** connected to the base stations **270**. The base station controllers **275** provide call resource allocation and mobility management functionality including soft handoffs between the base stations **270**. Furthermore, the base station controllers **275** transmit the received data to the mobile switching center **280**. The mobile switching center **280** provides additional routing services for interfacing with the PSTN **290**. Similarly, the PSTN **290** interfaces with the mobile switching center **280**, and the mobile switching center **280** interfaces with the base station controllers **275**. The base station controllers **275** control the base stations **270** to transmit forward link signals to the mobile terminals **100**.

FIG. 5 is a flowchart illustrating a method of controlling the mobile terminal **100** according to an embodiment of the present invention. FIGS. 6 and 7 illustrate connecting the mobile terminal **100** with external electronic devices **100a**, **100b** and **100c**.

Referring to FIGS. 1, 5, 6 and 7, the mobile terminal **100** outputs contents information acquired from the external devices **100a**, **100b** and **100c** and controls the external electronic devices **100a**, **100b** and **100c** based on the contents information. During this operation, the mobile terminal **100** may provide a user interface capable of effectively outputting and controlling the contents information.

The controller **180** of the mobile terminal **100** may connect the mobile terminal **100** to the external electronic devices **100a**, **100b** and **100c** (S10). For example, the external electronic devices are consumer electronic devices such as a TV **100a**, a mobile terminal or tablet computing device **100b**, and a computer **100c**.

12

The external electronic devices **100a**, **100b** and **100c** may include various electronic devices except for specific electronic devices. For example, if the user currently operates the mobile terminal **100**, electronic devices other than the mobile terminal **100** may be referred to as external electronic devices. If the user currently operates the first external electronic device **100a**, the mobile terminal **100** and the second and third external electronic devices **100b** and **100c** may be referred to as external electronic devices. That is, the term “external” electronic device is a relative term. However, electronic devices other than the mobile terminal **100** are generally referred to as the external electronic devices **100a**, **100b** and **100c** hereinafter for the convenience of understanding. Furthermore, although the number of the external electronic devices **100a**, **100b** and **100c** is three in several drawings and the following description, the number of the external electronic devices is not limited to three and may be less than or greater than three.

The external electronic devices **100a**, **100b** and **100c** may wire-communicate or wireless-communicate with other electronic devices. The wireless communication method of the external electronic devices **100a**, **100b** and **100c** may involve communication with the wireless communication unit **110** of the mobile terminal **100** so that detailed explanation thereof is omitted. Connections between the mobile terminal **100** and the external electronic devices **100a**, **100b** and **100c** will be explained in detail later with reference to FIGS. 6 and 7.

Upon connections of the mobile terminal **100** with the external electronic devices **100a**, **100b** and **100c**, the controller **180** may acquire information about contents being output from the external electronic devices **100a**, **100b** and **100c** (S20). The external electronic devices **100a**, **100b** and **100c** may respectively output contents through displays **151a**, **151b** and **151c** included therein.

The information about contents may correspond to the contents themselves or may include description of the contents and information about the source of the contents. When the first external electronic device **100a** outputs contents ‘A’, for example, the mobile terminal **100** can acquire the contents ‘A’ from the first external electronic device **100a**. Furthermore, the mobile terminal **100** can acquire detailed information including the title and running time of the contents ‘A’. Moreover, the mobile terminal **100** may acquire the address of the source of the contents ‘A’, such as a universal resource locator (URL). If the mobile terminal **100** acquires the address of the contents source, the mobile terminal **100** can obtain the contents ‘A’ without directly receiving the contents ‘A’ through communication with the first external electronic device **100a**. Accordingly, the controller **180** of the mobile terminal **100** can select one of a route of the acquisition of the contents from the address of the contents source and a route of the acquisition of the contents from the first external electronic device **100a**, which is more advantageous in terms of data transmission rate.

When the mobile terminal **100** acquires the contents information being output from the external electronic devices **100a**, **100b** and **100c** connected thereto, the controller **180** may output widgets reflecting the acquired contents information from the mobile terminal **100** (S30).

The contents information may include information related to rendering of contents. In such cases, it may be more easily understood if the contents are assumed to be a moving picture (also referred to herein as video). For example, when the mobile terminal **100** transmits contents to at least one of the external electronic devices **100a**, **100b**, and **100c**, informa-

tion regarding reproduction time point of the contents that is being reproduced at the mobile terminal **100** can be transmitted along with the contents.

If the information regarding reproduction time point and the contents are transmitted together, the external electronic device **100a**, **100b**, and/or **100c** which has received the contents can reproduce the contents continuously without repeating the parts that were already reproduced in the mobile terminal **100** or re-searching of the contents by a user. In other words, the information regarding reproduction time point

allows seamless reproduction of the contents such that a user can watch the contents via the external electronic device **100a**, **100b**, and/or **100c** without additionally controlling the same.

The contents information can be transmitted from the mobile terminal **100** to the external electronic devices **100a**, **100b**, and/or **100c** in response to a touch and drag input comprising touching a widget and then dragging the same to a desired external electronic device on a display screen of the display module **151**. For example, when widgets respectively corresponding to the external electronic devices **100a**, **100b**, and **100c** are displayed on the display module **151** of the mobile terminal **100**, the touch and drag input may be touching a first widget and then dragging the first widget to a second widget on the display screen. Upon receiving such touch and drag input, the mobile terminal **100** can transmit the contents of a first external electronic device **100a** corresponding to the first widget to a second external electronic device **100b** corresponding to the second widget, and at the same time, can also transmit contents information including reproduction time point of the contents being transmitted. Thus, the second external electronic device **100b** that has received the contents and/or contents information can reproduce the contents continuously from the reproduction point indicated in the contents information.

Further, contents and/or contents information may be transmitted to a plurality of external electronic devices **100a**, **100b**, and **100c** at the same time. For example, if a plurality of widgets are selected by a user via multi-touch, the mobile terminal **100** may transmit the contents and/or contents information to the plurality of external electronic devices **100a**, **100b**, and **100c** at the same time. Transmission of contents and/or contents information in response to selection of widget(s) will be described in more detail later in the corresponding section.

As describe above, the acquired contents information may be output in the form of widgets. The widgets respectively corresponding to the contents information may represent the contents information in the form of icons and reflect the status of each of the external electronic devices **100a**, **100b** and **100c**. For example, images output from the external electronic devices **100a**, **100b** and **100c** can be displayed in synchronization with the widgets or relative locations of the external electronic devices **100a**, **100b** and **100c** may be represented by relative locations of the widgets displayed on the display module **151**.

When the mobile terminal **100** can output the acquired contents information in the form of widgets, the user can enjoy contents through various routes. For example, if the first external electronic device **100a** corresponds to a TV receiver located in a living room of a house, the user may watch the contents 'A' through the TV receiver **100a** in the living room. In this case, when the user needs to go out of the house, the user can transfer the contents 'A' and the information about the contents 'A' being output from the first external electronic device **100a** to the mobile terminal **100**. Further, the user can play the contents 'A' in the mobile terminal **100** based on the

information about the contents 'A' received by the mobile terminal **100**. Accordingly, the user can continuously watch the contents 'A' and convenience of use can be improved.

Another example of enjoying contents through various routes is described. The user may watch the contents 'A' corresponding to a soccer game through the first external electronic device **100a** which is a TV receiver in a living room of the house. The contents 'A' output through the TV receiver may be a moving picture obtained by photographing a soccer stadium with a camera. Here, the user may operate the mobile terminal **100** to acquire information about the contents 'A' from the first external electronic device **100a**. Further, the user may output an image, i.e., the soccer game, photographed by the camera through the mobile terminal **100** based on the acquired information. That is, the user can output the identical contents via both one of the external electronic devices and another electronic device such that at least one of the viewpoint and output time of the contents is different from that of the image. By using this function, the user can enjoy a desired best image.

While the mobile terminal **100** outputs the acquired information about the contents, the controller **180** may receive an operating signal with respect to the widgets (**S40**) and control the external electronic devices **100a**, **100b** and **100c** based on the received operating signal (**S50**).

The operating signal may be a control signal generated by the user or a control operation of the controller **180**. For example, the operating signal may be a signal generated in response to a touch input applied to the display module **151** of the mobile terminal **100** to change contents to be displayed on the overall screen of the display module **151** or change the images displayed on the external electronic devices **100a**, **100b** and **100c**.

When the operating signal with respect to the widgets is generated, the controller **180** may output a control signal for changing the operations of the external electronic devices **100a**, **100b** and **100c** based on the operating signal. For example, the controller **180** can generate a control signal for outputting the contents 'A', being output from the first external electronic device **100a**, through the second external electronic device **100b**.

Referring to FIG. 6, the mobile terminal **100** can directly communicate with the external electronic devices **100a**, **100b** and **100c** to acquire contents information. The first, second and third external electronic devices **100a**, **100b** and **100c** may be located around or near the mobile terminal **100**. The first, second and third displays **151a**, **151b** and **151c** respectively provided to the first, second and third external electronic devices **100a**, **100b** and **100c** may respectively display contents 'A', 'B' and 'C'.

The mobile terminal **100** may communicate with the first, second and third external electronic devices **100a**, **100b** and **100c** through WiFi Direct which enables direct peer-to-peer (P2P) communication between electronic devices without having an additional access point (AP) for relaying data communication. There is a direct communication method, Ad-hoc, similar to WiFi Direct. While Ad-hoc is used for electronic devices relatively close to each other and has a communication speed limited to 11 Mbps, WiFi Direct can support 802.11n to permit electronic devices located farther apart from each other to directly communicate with each other at a communication speed of approximately 300 Mbps.

Sharing contents information between the mobile terminal **100** and the first, second and third external electronic devices **100a**, **100b** and **100c** via direct/indirect communication to display the contents information may be referred to as 3-screen or n-screen. In this case, the mobile terminal **100** and

15

the first, second and third external electronic devices **100a**, **100b** and **100c** may synchronize their video signals and/or audio signals with each other and output the synchronized signals.

Referring to FIG. 7, the mobile terminal **100** may directly or indirectly communicate with the first, second and third external electronic devices **100a**, **100b** and **100c**. For example, the mobile terminal **100** can communicate with the third external electronic device **100c** via a first AP **AP1** and communicate with the second external electronic device **100b** via a second AP **AP2**. That is, the mobile terminal **100** can indirectly exchange contents information with the second and third external electronic devices **100b** and **100c** via external networks.

Moreover, the mobile terminal **100** can directly communicate with the first external electronic device **100a** using WiFi Direct. Contents shared by the mobile terminal **100** and the first external electronic device **100a** may be received through a satellite **ST**. That is, contents information can be stored in an external storage that is not in the mobile terminal **100** or the first external electronic device **100a**. Even when the contents information is stored in the external storage and transmitted from the external storage to the mobile terminal **100** and the first external electronic device **100a** through the satellite **ST**, the mobile terminal **100** can transmit a control signal to the first external electronic device **100a**. The control signal transmitted to the first external electronic device **100a** may affect the contents 'A' output from the first external electronic device **100a**. For example, the control signal can stop outputting the contents 'A' or change the time and/or viewpoint of the contents 'A'.

FIGS. 8 and 9 illustrate an operation of a mobile terminal **100** according to an embodiment of the present invention to acquire contents information from the external electronic devices and output the contents information.

Referring to FIGS. 1, 8 and 9, the controller **180** of the mobile terminal **100** may display first, second and third widgets **S1**, **S2** and **S3** acquired from the external electronic devices **100a**, **100b** and **100c** on the display module **151**. The user may select a desired one of the first, second and third widgets **S1**, **S2** and **S3** and display the selected widget on the overall screen of the display module **151**.

The controller **180** may execute a managing mode of displaying acquired images in the form of thumbnails. The first, second and third widgets **S1**, **S2** and **S3** displayed in the form of thumbnails may represent positions of the external electronic devices **100a**, **100b** and **100c** relative to the position of the mobile terminal **100**. For example, the first widget **S1** is acquired from the first external electronic device **100a** located in front of the mobile terminal **100**, the second widget **S2** is acquired from the second external electronic device **100b** located on the left of the mobile terminal **100** and the third widget **S3** is acquired from the third external electronic device **100c** located on the right of the mobile terminal **100**. The controller **180** may display the first, second and third widgets **S1**, **S2** and **S3** based on these relative positions.

The user may select a desired one of the displayed first, second and third widgets **S1**, **S2** and **S3** by touching the desired one with a finger **F** as shown in FIG. 8. Referring to FIG. 9, the widget **S3** selected by the user may be displayed on the overall screen area of the display module **151**. Accordingly, the user can seamlessly view the third widget **S3**, which has been displayed on the third external electronic device **100c**, through the mobile terminal **100**. The display module **151** displaying the third widget **S3** may also display a first icon **I1**. When the first icon **I1** is selected, the controller **180** may start the managing mode.

16

FIGS. 10, 11 and 12 illustrate operations of displaying contents information acquired by the mobile terminal **100** according to an embodiment of the present invention and manipulating the displayed contents information. The mobile terminal **100** can change displayed images through various operations.

Referring to FIG. 10(a), the display module **151** of the mobile terminal **100** may display the first, second and third widgets **S1**, **S2** and **S3** respectively acquired from the first, second and third external electronic devices **100a**, **100b** and **100c**. The user may select one of the first, second and third widgets **S1**, **S2** and **S3**, which will be displayed. For example, the user can locate a desired widget at the center of the display module **151**. Accordingly, the first widget **S1** can be displayed in the overall screen area of the display module **151** in the case of FIG. 10(a).

Referring to FIG. 10(b), the user may touch the display module **151** through a first touch operation **T1**. When the user performs a drag operation on the display module **151** through the first touch operation **T1**, the first, second and third widgets **S1**, **S2** and **S3** can rotate in the dragging direction.

Referring to FIG. 10(c), upon completion of the first touch operation **T1** by the user, the layout of images displayed on the display module **151** may be changed. When the layout is changed such that the second widget **S2** is displayed in front, as shown in FIG. 10(c), the second widget **S2** can be displayed in the overall screen area of the display module **151**.

Referring to FIG. 11(a), the display module **151** of the mobile terminal **100** may display first through fifth widgets **S1** through **S5** acquired from various electronic devices. The first widget **S1** among the displayed widgets **S1** through **S5** may be displayed in the overall screen area of the display module **151**. In this state, the user may want to display another image. Then, the user may touch the display screen of the display module **151** with his/her finger **F** through a second touch operation **T2** in the horizontal direction. When the user's touch input is received, the controller **180** may rotate the first through fifth widgets **S1** through **S5** on a virtual axis.

Referring to FIG. 11(b), the widgets **S1** through **S5** displayed on the display module **151** sequentially rotate and a specific widget, the second widget **S2**, is displayed at the center of the display module **151**. The second widget **S2** displayed at the center of the display module **151** may be displayed in the overall screen area of the display module **151** in response to a control signal of the controller **180**.

Referring to FIG. 12(a), the display module **151** of the mobile terminal **100** may display the first through fifth widgets **S1** through **S5** acquired from the various electronic devices. Referring to FIGS. 1 and 12(b), when the user tilts the mobile terminal **100** to the left or right, the sensing unit **140** of the mobile terminal **100**, which may include an acceleration sensor, can sense the posture of the mobile terminal **100**. Accordingly, the controller **180** can move the displayed first through fifth widgets **S1** through **S5** to the left or right according to the direction sensed by the acceleration sensor. The user can control the moving speed of the first through fifth widgets **S1** through **S5** by adjusting the tilt of the mobile terminal **100**.

FIG. 13 is a flowchart illustrating, in detail, the operation **S40** of receiving an operating signal with respect to output contents information described in FIG. 5.

Referring to FIGS. 1, 6 and 13, the operation **S40** of receiving an operating signal with respect to contents information output from the mobile terminal **100** may include selecting the managing mode (**S41**). The managing mode displays searched external electronic devices such that the user can operate the displayed external electronic devices. When the

17

managing mode is selected, the searched external electronic devices may be displayed in the form of thumbnails. Further, the display form of the searched external electronic devices can be changed, new external electronic devices can be searched, or searched external electronic devices can be deleted in the managing mode, which will be explained in more detail later.

When the managing mode is selected, the external electronic devices can be displayed based on the relative positions thereof. The relative positions may be positions of the first, second and third external electronic devices **100a**, **100b** and **100c** relative to the position of the mobile terminal **100**. For example, the positions of the first, second and third external electronic devices **100a**, **100b** and **100c** are relative to the mobile terminal **100** that is positioned at the center on the display module **151**.

An operating signal with respect to the displayed screen may be received (**S43**) and the displayed screen may be changed in response to the received operating signal (**S44**). The operating signal with respect to the displayed screen may be a signal generated by a user's touch on images displayed on the display module **151**. When the operating signal is generated, the controller **180** may change the display form of the display module **151** in response to the operating signal. For example, the controller **180** can change the layout of displayed images or change images shared by the mobile terminal **100** and the external electronic devices **100a**, **100b** and **100c**.

FIGS. **14** through **19** illustrate operations of outputting contents information received from external electronic devices and controlling the external electronic devices based on the contents information. In the managing mode, the user can operate received contents information in various manners to control data communication with the external electronic devices **100a**, **100b** and **100c**.

Referring to FIG. **14(a)**, the display module **151** of the mobile terminal **100** may display the first widget **S1** received from the first external electronic device **100a**. The user may select a second icon **I2** displayed at a certain portion of the display module **151**. The second icon **I2** may be a menu for entering the managing mode.

Referring to FIG. **14(b)**, when the mobile terminal **100** enters the managing mode, the first, second and third widgets **S1**, **S2** and **S3** respectively received from the first, second and third external electronic devices **100a**, **100b** and **100c** may be displayed on the display module **151**. Furthermore, a selected screen **CS** may be displayed at the center of the display module **151**.

The selected screen **CS** may be an image to be displayed in the overall screen area of the display module **151** when the managing mode is ended. That is, an image selected from images of the external electronic devices to be shared by the user may be displayed. The selected screen **CS** may display images received from the external electronic devices **100a**, **100b** and **100c** continuously or display images received from the external electronic devices **100a**, **100b** and **100c** at specific intervals. That is, the selected screen **CS** may display a video or a still image. In FIG. **14(b)**, the first widget **S1** received from the first external electronic device **100a** is displayed as the selected screen **CS**.

Referring to FIG. **15(a)**, the user may change the display of the selected screen **CS**. The display of the selected screen **CS** may be changed through a third touch operation **T3** starting from one of the first, second and third widgets **S1**, **S2** and **S3**, for example **S2**, toward the selected screen **CS**.

18

Referring to FIG. **15(b)**, the second widget **S2** instead of the first widget **S1** is selected as the selected screen **CS** according to the third touch operation **T3**. When an external electronic device which will share the selected screen **CS** with the mobile terminal **100** is selected, the user may select the first icon **I1** for displaying the selected screen **CS** in the overall screen area of the display module **151**.

Referring to FIG. **15(c)**, the second widget **S2** selected as the selected screen **CS** may be displayed on the display module **151**. Further, the second icon **I2** for entering the managing mode may be displayed on a portion of the display module **151**.

Referring to FIG. **16(a)**, the user may select the second widget **S2** among displayed images with his/her finger **F**. Referring to FIG. **16(b)**, detailed information about contents information corresponding to the second widget **S2** selected by the user may be displayed in a first pop-up window **P1**. As described above, the contents information may be the contents, description of the contents and information about the source of the contents. The first pop-up window **P1** may display the description of the contents. Furthermore, the information about the contents source may be displayed if required.

Referring to FIGS. **1**, **6** and **17**, specific contents information may be blocked from being shared. For example, the second external electronic device **100b** corresponding to the second widget **S2** does not allow the contents information corresponding to the second widget **S2** to be shared with the mobile terminal **100**. When contents information is blocked from being shared with the mobile terminal **100** although an external electronic device corresponding to the contents information is searched and displayed on the display module **151** of the mobile terminal, the controller **180** may inform the user of the fact through a specific icon **S2**.

Referring to FIG. **18(a)**, the display module **151** may display a rotation icon **I3**. The rotation icon **I3** may be an object rotating clockwise or counter clockwise in response to a fourth touch operation **T4**. The rotation icon **I3** may have a direction indicator **D** to indicate the direction currently pointing by the rotation icon **I3**. In FIG. **18(a)**, the rotation icon **I3** points toward the first widget **S1** as indicated by the direction of the direction indicator **D**. Accordingly, the first widget **S1** can be displayed on the overall screen of the display **151** when the user selects the first icon **I1**.

Referring to FIG. **18(b)**, the user may rotate the rotation icon **I3** to change the image to be displayed on the overall screen of the display module **151**. For example, when the rotation icon **I3** is rotated, the direction indicator **D** points toward the second widget **S2**.

Referring to FIG. **19(a)**, contrary to the embodiment shown in FIGS. **18(a)** and **18(b)**, the rotation icon **I3** may be fixed. Thus, the first, second and third widgets **S1**, **S2** and **S3** arranged around the rotation icon **I3** may be rotated clockwise or counterclockwise in the direction of a fifth touch operation **T5**.

Referring to FIG. **19(b)**, the user may rotate the first, second and third widgets **S1**, **S2** and **S3** in the direction of the fifth touch operation **T5** to display the second widget **S2** instead of the first widget **S1** on the overall screen of the display module **151**.

FIG. **20** illustrates an operation of a mobile terminal **100** according to an embodiment of the present invention to search for a new external device. In this embodiment, the mobile terminal **100** can provide a user interface by which the user can manually search for an external electronic device.

19

Referring to FIG. 20(a), the user may rotate the rotation icon I3 such that the direction indicator D points toward a direction in which no image is currently displayed. When the rotation icon I3 is rotated to the direction in which no image is currently displayed, the controller 180 may search for a new external electronic device which is present in the pointed direction.

Referring to FIG. 20(b), if a new external electronic device exists in the direction pointed by the rotated rotation icon I3, the mobile terminal 100 can communicate with the new external electronic device to receive contents information from the new external electronic device. Upon reception of the contents information, the controller 180 may display a fourth image S4 corresponding to the newly received external electronic device on the corresponding position of the display module 151.

FIG. 21 illustrates a layout of external electronic devices searched by a mobile terminal according to an embodiment of the present invention. The mobile terminal 100 can display images received from the searched external electronic devices in respective spaces.

Referring to FIG. 21, the mobile terminal 100 may receive contents information corresponding to the first through fifth widgets S1 through S5. Here, the external electronic devices corresponding to the first and second widgets S1 and S2, the external electronic device corresponding to the third widget S3 and the external electronic devices corresponding to the fourth and fifth widgets S4 and S5 may be respectively located in different spaces or areas. For example, the external electronic devices corresponding to the first and second widgets S1 and S2 may be located in a large room on the second floor, the external electronic device corresponding to the third widget S3 may be located in a small room on the second floor, and the external electronic devices corresponding to the fourth and fifth widgets S4 and S5 may be placed in a living room on the first floor.

The controller 180 may divide display screen of the display module 151 into first, second and third areas A1, A2 and A3 to visually represent the external electronic devices arranged in different spaces. The selected screen CS displaying contents selected to be shared with the mobile terminal 100 may be displayed on a designated portion of the display module 151.

FIG. 22 is a flowchart illustrating an operation relating to a screen event in a mobile terminal according to an embodiment of the present invention and FIG. 23 illustrates the operation relating to the screen event shown in FIG. 22.

Referring to FIGS. 22 and 23, the mobile terminal 100 may inform the user when a set screen event is received. The screen event may be a function of displaying information in which the user is interested in. Specifically, when contents, which satisfy a condition set by the user among the contents output from external electronic devices, are output, the screen event displays the contents of interest on the mobile terminal 100.

To execute the screen event function, the controller 180 determines whether a set screen event signal is received (S61), displays the generation of the screen event (S62) and determines whether mobile terminal 100 is connected to an external electronic device generating the screen event (S63).

The set screen event signal may be generated only when a specific condition previously set by the user is satisfied. For example, if the user is interested in tropical fish, the user can set 'cardinal tetra' as a keyword. The controller 180 filters contents information received from external electronic devices connected to the mobile terminal 100 to determine whether contents information including the keyword is present. If there is contents information including the key-

20

word, the controller 180 informs the user by displaying the information, indicating that there is contents information including the keyword, on the display module 151 of the mobile terminal 100.

Referring to FIG. 23(a), the user of the mobile terminal 100 sets a screen event by inputting specific keywords in which the user is interested in and saving the keywords. Thereafter, while the display module 151 of the mobile terminal 100 displays the first widget S1, as shown in FIG. 23(b), if the set screen event is generated, a second pop-up window P2 may be displayed, as shown in FIG. 23(c). The second pop-up window P2 may display the detailed information about the screen event and the name of the external electronic device generating the screen event. The second pop-up window P2 may additionally display a message that inquires whether to connect to the external electronic device.

FIGS. 24 and 25 are flowcharts illustrating an operation of a mobile terminal according to an embodiment of the present invention to share a contents output resource.

Referring to FIGS. 1, 24 and 25, the mobile terminal 100 can share the contents output resource. The contents output resource may be an application, codec or the like which can output specific contents. Even when contents are shared by electronic devices, the shared contents cannot be output properly if there is no resource capable of outputting the shared contents. Furthermore, although the contents may be output properly from a specific electronic device, the same contents may not be output properly from another electronic device because the resolution of the contents may be different from that of the other electronic device. The mobile terminal 100 can prevent these problems by sharing the contents output resource.

To achieve this, operation S30 in FIG. 5, i.e., outputting acquired contents information through the mobile terminal 100, may include checking the contents output resource (S31). The operation S31 of checking the contents output resource may be performed on the mobile terminal 100 connected to other external electronic devices. Specifically, the operation S31 may be performed when the mobile terminal 100 receives contents information from the external electronic devices.

The controller 180 may determine whether the contents information can be output properly (S32) and acquire the contents output resource from an external electronic device connected to the mobile terminal 100 if the contents information cannot be output properly (S33) or obtain the contents output resource from another external electronic device (S34).

It is probable that an external electronic device that transmits contents to the mobile terminal 100 may possess the contents output resource capable of playing the contents. Accordingly, if the mobile terminal 100 does not have contents output resource, the mobile terminal 100 may receive the contents output resource from the external electronic device. If the external electronic device does not have the contents output resource, the mobile terminal 100 may acquire the contents output resource from other external electronic devices. Here, the other external electronic device may be one of electronic devices that are currently connected to the mobile terminal 100 and a server linked to a network. Finally, when the contents output resource is secured, the acquired contents may be output (S35).

Referring to FIGS. 1 and 25, the contents output resource may be transmitted from the mobile terminal 100 to an external electronic device. To execute this function, operation S50 in FIG. 5, i.e., controlling the external electronic devices based on the received operating signal, may include generat-

ing a signal for operating transmission of contents to an external electronic device (S51). The signal for operating transmission of contents to the external electronic device may be an input signal generated in response to user input or a control signal of the controller 180 for transmitting specific contents from the mobile terminal 100 to the external electronic device.

Upon generation of the signal for operating transmission of contents to the external electronic device, the controller 180 may check whether the external electronic device has the contents output resource (S52). That is, the mobile terminal 100 which will transmit the contents can check whether the external electronic device has the contents output resource capable of outputting the contents.

When it is determined that the external electronic device has no contents output resource (S53), the controller 180 may transmit the contents output resource (S54), and then transmit the contents (S55).

The external electronic device which received the contents may receive user input with regard to processing of the contents received along with an alert of occurrence of a screen event. For example, the external electronic device may display a pop up window to receive an input for selecting an operation such as displaying, storing, reproducing, deleting, or rejecting the contents.

From the pop up window displaying operations available for the contents, the user may select a desired operation. Once the user input is received, an operation corresponding to the user input is performed. Furthermore, the external device which received the contents may generate and display an icon or widget corresponding to the received contents so that operations related to the contents can be performed easily in the future.

The mobile terminal 100 which will transmit the contents may have the contents output resource for outputting the contents. Accordingly, the mobile terminal 100 may also transmit the contents output resource to the external electronic device. When the transmission of the contents output resource to the external electronic device is finished and the external electronic device is ready to output the contents, the contents can be transmitted to the external electronic device.

Although the external electronic devices have been described as being fixed to specific positions around the mobile terminal in the aforementioned embodiments, the positions of the external electronic devices can be changed according to the variable position of the mobile terminal. For example, electronic devices capable of communicating with the mobile terminal moving with the user when the user goes to work from home by transportation means may correspond to the external electronic devices.

The above-described method of controlling the mobile terminal may be written as computer programs and may be implemented in digital microprocessors that execute the programs using a computer readable recording medium. The method of controlling the mobile terminal may be executed through software. The software may include code segments that perform required tasks. Programs or code segments may also be stored in a processor readable medium or may be transmitted according to a computer data signal combined with a carrier through a transmission medium or communication network.

The computer readable recording medium may be any data storage device that can store data that can be thereafter read by a computer system. Examples of the computer readable recording medium may include read-only memory (ROM), random-access memory (RAM), CD-ROMs, DVD±ROM, DVD-RAM, magnetic tapes, floppy disks, optical data stor-

age devices. The computer readable recording medium may also be distributed over network coupled computer systems so that the computer readable code is stored and executed in a distribution fashion.

A mobile terminal may include a first touch screen configured to display a first object, a second touch screen configured to display a second object, and a controller configured to receive a first touch input applied to the first object and to link the first object to a function corresponding to the second object when receiving a second touch input applied to the second object while the first touch input is maintained.

A method may be provided of controlling a mobile terminal that includes displaying a first object on the first touch screen, displaying a second object on the second touch screen, receiving a first touch input applied to the first object, and linking the first object to a function corresponding to the second object when a second touch input applied to the second object is received while the first touch input is maintained.

Any reference in this specification to “one embodiment,” “an embodiment,” “example embodiment,” etc., means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of this document. The appearances of such phrases in various places in the specification are not necessarily all referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with any embodiment, it is submitted that it is within the purview of one skilled in the art to effect such feature, structure, or characteristic in connection with other ones of the embodiments.

Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

What is claimed is:

1. A mobile terminal comprising:

a display comprising a touch screen;

a hardware communication unit configured to receive, from other electronic devices, information related to video content being reproduced at each of the other electronic devices, wherein the information includes a reproduction time point corresponding to a position in the video content that is being reproduced by a corresponding one of the other electronic devices at a time when the information is transmitted to the mobile terminal; and

a controller configured to control the display to:

display a plurality of widgets respectively corresponding to the other electronic devices, each of the plurality of widgets comprising an image of the video content that is displayed at the corresponding one of the other electronic devices, wherein the plurality of widgets are arranged and displayed based on actual relative positions of the other electronic devices with respect to an actual position of the mobile terminal; and

display the video content on an entire screen area of the display from the reproduction time point based on the

23

information received from the corresponding one of the other electronic devices in response to a touch input for selecting the corresponding one of the other electronic devices, the touch input received via a corresponding one of the plurality of widgets displayed on the display;

wherein:

the actual position of the mobile terminal corresponds to a center of the screen area; and

the corresponding one of the plurality of widgets is displayed distinctively over the rest of the plurality of widgets in response to the touch input and the distinctively displayed one of the plurality of widgets is eventually displayed by itself on the entire screen area of the display after being displayed distinctively among the plurality of widgets for a preset period of time.

2. The mobile terminal of claim 1, wherein in response to a second touch input, including touching on the touch screen at a location relative to a first one of the plurality of widgets and dragging from the touched first one of the plurality of widgets to a second one of the plurality of widgets, information related to contents being executed at a first one of the other electronic devices corresponding to the first one of the plurality of widgets is transmitted to a second one of the other electronic devices corresponding to the second one of the widgets.

3. The mobile terminal of claim 1, wherein the hardware communication unit communicates with at least one of the other electronic devices wirelessly, and the controller is further configured to control the display to display a menu when a first one of the plurality of widgets is selected, and the menu comprises a menu item for sending a message from the mobile terminal to a first one of the other electronic devices corresponding to the selected first one of the plurality of widgets via the hardware communication unit.

4. The mobile terminal of claim 1, wherein:

the controller is further configured to control the display to arrange and display the plurality of widgets based on actual relative positions of the electronic devices with respect to an actual position of the mobile terminal; and the actual position of the mobile terminal corresponds to a center of the screen area.

5. The mobile terminal of claim 1, wherein:

the controller is further configured to control the display to display the corresponding one of the plurality of widgets distinctively over the rest of the plurality of widgets; and after a preset period of time, the distinctively displayed one of the plurality of widgets is eventually displayed on the entire screen area of the display.

6. The mobile terminal of claim 1, wherein the controller is further configured to control the display to arrange and display the plurality of widgets based on priority of the received information, and wherein criteria for determining the priority is preset by a user or by default.

7. The mobile terminal of claim 1, wherein the controller is further configured to control the display to display a rotatable icon along with the plurality of widgets such that an operating signal for selecting a specific one of the plurality of widgets is generated in response to rotation of the icon displayed on the display.

8. The mobile terminal of claim 1, further comprising a memory configured to store a specific keyword that is used to identify contents information related to the specific keyword, wherein the controller is further configured to output alert information upon detecting contents information related to the specific keyword from at least one of the other electronic devices.

24

9. The mobile terminal of claim 1, wherein the controller is further configured to request an electronic device to provide a resource required to display the video content properly on the display, and the display is further configured to display the video content after receiving the resource from the electronic device.

10. The mobile terminal of claim 1, wherein the information further includes supplemental information about the video content and information about a source of the video content, the supplemental information comprising at least a description, a title or running time of the video content, or a name or type of an electronic device providing the video content.

11. The mobile terminal of claim 1, wherein the widgets are categorized into at least two groups, at least one widget in each group being grouped together based on a location at which at least one electronic device corresponding to the at least one widget is located, and wherein each group is identified by an assigned name of the location.

12. The mobile terminal of claim 1, wherein the controller is further configured to control the display to display the information related to the video content displayed at the corresponding one of the other electronic devices on a first defined portion of the screen area while the plurality of widgets are displayed on a second defined portion of the screen area.

13. The mobile terminal of claim 12, wherein the information is displayed as a still image on the first defined portion of the screen area, and wherein the still image is updated periodically according to progress of the content displayed at the corresponding one of the other electronic devices.

14. The mobile terminal of claim 1, wherein the video content provided to the corresponding one of the other electronic devices is stored in an external storage that is not included in the mobile terminal and the other electronic devices.

15. The mobile terminal of claim 1, wherein:

the image of the video content included in the widget is identical to the video content displayed at the corresponding one of the other electronic devices except for its size; and

the image of the video content is displayed on the display in synchronization with the video content displayed at the corresponding one of the other electronic devices.

16. A method of controlling a mobile terminal, the method comprising:

communicating with other electronic devices;

receiving information related to video content being reproduced at each of the other electronic devices from each of the other electronic devices, wherein the information includes a reproduction time point corresponding to a position in the video content that is being reproduced by a corresponding one of the other electronic devices at a time when the information is transmitted to the mobile terminal;

displaying, on a display of the mobile terminal, a plurality of widgets respectively corresponding to the other electronic devices, each of the plurality of widgets comprising an image of the video content that is being displayed at the corresponding one of the other electronic devices, wherein the plurality of widgets are arranged and displayed based on actual relative positions of the other electronic devices with respect to an actual position of the mobile terminal; and

displaying the video content on an entire screen area of the display from the reproduction time point based on the information received from the corresponding one of the

other electronic devices in response to a touch input for selecting the corresponding one of the other electronic devices, the touch input received via a corresponding one of the plurality of widgets displayed on the display; wherein: 5
the actual position of the mobile terminal corresponds to a center of the screen area; and
the corresponding one of the plurality of widgets is displayed distinctively over the rest of the plurality of widgets in response to the touch input received and the 10
distinctively displayed one of the plurality of widgets is eventually displayed by itself on the entire screen area of the display after being displayed distinctively among the plurality of widgets for a preset period of time.
17. The method of claim 16, further comprising: 15
receiving a specific keyword to identify contents information related to the specific keyword; and
outputting alert information upon detecting the contents information related to the specific keyword from at least one of the other electronic devices. 20
18. The method of claim 16, wherein the mobile terminal communicates with at least one of the other electronic devices wirelessly, the method further comprising requesting an electronic device to provide a resource required to display the video content properly before displaying the video content on 25
the display.

* * * * *